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TANGANYIKA TERRITORY

DEPARTMENT OF AGRICULTURE

Annual Report

1937

PART I

1938
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TANGANYIKA TERRITORY

DEPARTMENT OF AGRICULTURE

Annual Report

1937

PART I

Reports of the Senior Agricultural Officers on the areas of which they are in charge are published as Part II of this report. Annual Reports of the Coffee, Sisal and other experimental stations have been published separately as pamphlets. These reports are obtainable either from the Director of Agriculture, Morogoro, or from the Government Printer, Dar es Salaam

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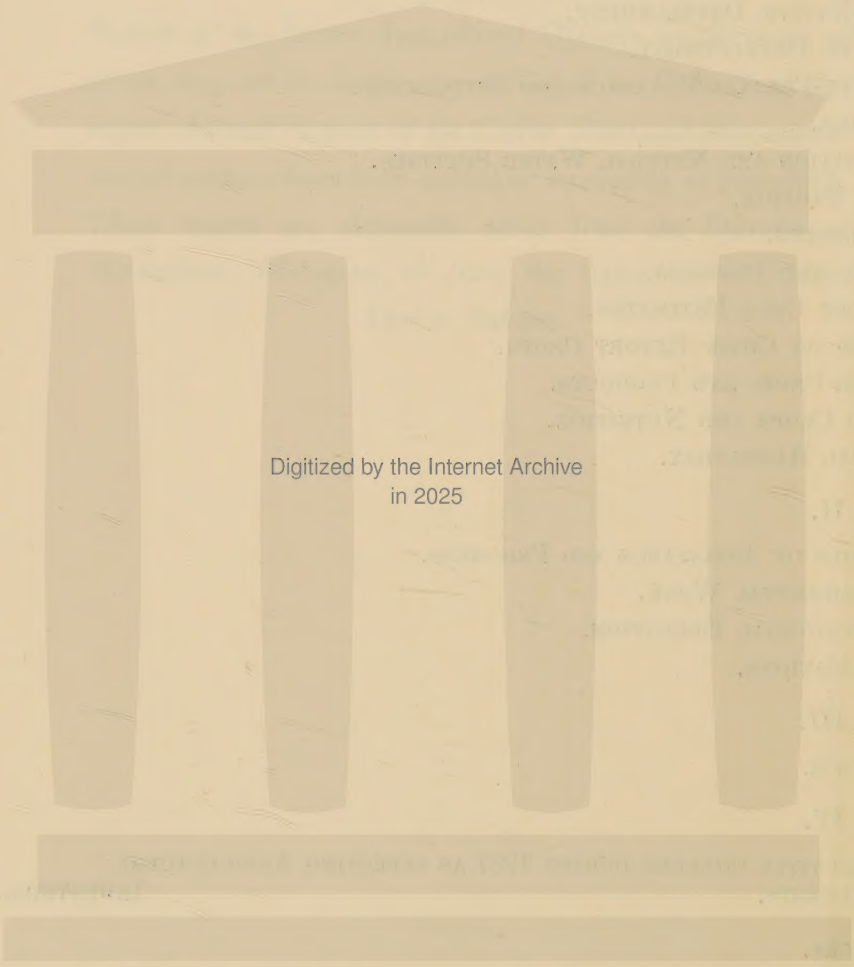

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DEPARTMENT OF AGRICULTURE

ANNUAL REPORT 1937

PART I

SECTION I.—General Review of the Year

I would preface this year's report by stating that after the accelerated development of departmental activities which took place between 1931 and 1936, together with the establishment of the coffee and sisal stations, the Iheme, Lubaga, Ukiriguru, Nyamahona and Kingolwira experimental and extension farms, development at Morogoro and Muheza, and the school at Nyakato, it became imperative to consider the commitments of the department throughout the Territory in relation to the staff available, especially as it was understood that no additional finance could be anticipated. It was decided that the time had come to consolidate rather than to expand, and it was desirable to direct especial attention to the development of experimental, educational and extension work in connection with the agricultural stations, without interfering with established field services.

The season on the whole was one of somewhat unfavourable climatic conditions. Only the Eastern province enjoyed favourable rains. In the Lake and Western provinces excessive and unseasonable rainfall caused considerable damage to maturing cotton and groundnut crops. Extremely heavy rainfall was also experienced in the Northern province. Nevertheless crop production must be regarded as satisfactory and no food shortages were experienced.

The year was interesting in that it showed the manner in which the Territory is able to maintain production even when whole provinces suffer adverse conditions. For example, although the cotton crop was heavily reduced by inclement weather in the main producing areas, yet other areas came up to or even exceeded expectations; thus the total crop was almost up to estimate. Also, as anticipated there was an increased planting of groundnuts following the higher prices paid in 1936. Thus, despite the damage caused by rain and the consequent difficulty of harvesting, the total output for the Territory reached a satisfactory figure. Despite difficulties, the production of sisal went still further ahead. These events point to the fact that this territory is so large that unsatisfactory conditions in one part of the Territory are offset by good conditions in other parts, and whilst production may not be so diverse as would be desirable, there appears to be some stability due to the variety of the climate and the size of the Territory.

The price of commodities fell rather heavily in the last few months of the year, the average extent of the fall being in the neighbourhood of thirty per cent. Sisal, coffee, cotton and to a lesser extent groundnuts, all showed heavy

falls. As these four crops are our main agricultural products, unless there is a change upwards during 1938 we can anticipate a substantial reduction in the total value of our agricultural exports in the coming season, to be offset only by an increased outturn. Also the normal December planting rains of the Lake and Western provinces were very light and cultivators in those provinces will have a busy time trying to crowd all their plantings into the very short period which will remain.

Non-Native Development

During the year steady progress was made with estate agriculture ; generally speaking, coffee, sisal and tea estates have been maintained in good upkeep. It is of interest to record that a certain farming finance organization has appointed a supervisor to oversee the work which is being done on the estates (coffee) on which it has advanced or is advancing working capital. In addition it proposes to establish a model coffee estate, on which demonstrations will be carried out following advice from the staff at the Lyamungu Experimental Station.

Much of the carelessly and extensively cultivated land used for cotton planting in the Morogoro and Kilosa districts has now been planted to sisal. This should check the erosion which was taking place on the large cleared fields in these districts.

Native Development

In a number of areas steady progress may be noted. It is quite clear to the department that in the Western and Lake provinces, as also the Central province, cultivators must keep a number of cattle continuously on their small farms and must regard the manure from the cattle as of paramount importance in their crop husbandry work. We know that where new land can be had for the clearing, it is customary for the native to regard shifting cultivation as preferable to the system of manuring and rotation. Especially is this so in "tsetse" country, but for the densely-populated lands which have been under cultivation for generations I believe there is no alternative but to improve practice. In the tsetse areas, especially in the Eastern province, where cattle cannot safely be introduced for a number of years, the clearing of bush land is not particularly disadvantageous provided it is done in such a way as not to engender soil erosion.

Native Peasant Holdings and Settlement

Reference to peasant holding schemes, and to individual peasant holdings has been made in the past in these reports. During the year under review, individual natives in various areas have been induced to follow some of the methods necessary for the adoption of mixed farming ; the advice given covers the whole scheme and management of the holding. In this way it is seen and is demonstrated that individual natives can undertake farming on a higher scale than the mass ; not only that, officers and others are satisfied from experience that better farming is possible for larger numbers of peasants and their families. Thus instead of one or two desirable practices only being put into operation by the mass of the people, such as erosion and cultivation rules with individuals it has been found possible to graft on to native methods quite a number of changes leading to mixed farming.

The peasant settlement centres have developed from the extension farms, for which finance was obtained from the Empire Cotton Growing Corporation

in 1933; the department had obtained two large areas 60 and 14 square miles respectively in fly country in which to establish these extension farms, the balance of the fly-bush remaining to be settled by incoming peasantry, or by workers from the experimental farms. Settlement progressed under supervision and followed practice as proved on the extension farms, and demonstrated on the two or three experimental small holdings which were run as part of the scheme. In the beginning the peasants are virtually tenants of the department; but by effective occupation they earn an undisturbed right to their holdings. Steadily each year newcomers take up plots, and as the numbers of plot holders increase, the bush is thinned and tsetse should be eliminated to make it possible safely to introduce cattle.

In time it is hoped that it will be possible to take a group of four or five successful settlers and place them as a nucleus in a new area, which has been laid out for settlement; in fact, a start was made in the Shinyanga district during the period under review. These nuclei will receive advice and supervision.

It must not be inferred that natives are weaned away from their tribal connections; it is happening that a great deal of the management of these settlements is devolving on the leading peasants in the settlement. Under the local native authorities, they will be able to deal with a number of matters which to-day are attended to by the officer in charge of the extension farm.

The aims are to promote and organize settlement, so that the efforts of the individuals are mutually beneficial to each settler, and to take advantage of the spirit of emulation which the African possesses in no small degree. The objects of the scheme of mixed farming for peasants are as follows:—

(a) To evolve a type of holding which will carry sufficient stock to enable the peasant to maintain the soil fertility of the land under cultivation.

(b) To induce systematic methods by allotting a conveniently shaped holding which will be economical to work and enable the farmer to keep a ready eye on crops (he will be able to cart manure to the fields with least effort, and to contour his land as a unit and not as a fragment circumscribed by other unprotected fields).

(c) To permit the keeping of cattle and to improve the quality of cattle by feeding and by affording facilities to obtain selected beasts of known parentage.

(d) To embody in the economy of the holding a system of crop rotation which assists the maintenance of soil fertility and affords a safeguard against what may be an undesirable extension of a single crop.

(e) To give the native an interest in, and a right to, his land without allowing him to offer it as a security against loans; and to prohibit fragmentation of holdings at any time.

With the assistance of the Carnegie Fund a tour is being undertaken by Mr J. G. M. King, Agricultural Officer, to investigate the conditions and progress of mixed farming and peasant holdings in Nigeria.

Labour

Possibly as a consequence of the interest and discussion aroused by the work of the Labour Committee, labour conditions are slowly improving, and employers are studying the requirements of their labourers with increasing interest and goodwill. The work of the ginnery inspectors amongst ginnery

owners has had good effect and improvement in the conditions of work and housing of ginnery labour is to be recorded, together with a reduced number of accidents to ginnery employees during 1937.

Irrigation and Natural Water Supplies

This important section of agricultural development is to be dealt with by an organization outside the department. Here it suffices to record that small irrigation projects, such as in the Same district, and the utilization of half-moon dams in the north-western circle, have been fostered. Assistance has been given in the layout of irrigation furrows by means of proper survey equipment, in order to obtain full command and economic use of the available waters.

I would remark that very great areas of fertile country would be improved, or would become available for cultivation, were they drained. Especially would an experiment on the large scale drainage of *mbuga** soils be of value, in demonstrating the improvement in the type of herbage which could ensue. Also cultivation could be extended into the *mbugas* from the margins. All that is needed in many cases is a well-sited large open drain running down the centre of the *mbuga*, with possibly marginal drains on either side leading at intervals into the main drain.

Soil Erosion

As projected in the report for 1936, a full report on the subject of soil erosion and the methods used in the dissemination of advice and information and the systems of demonstration was presented to Legislative Council. Since then several more areas have adopted simple soil conservation rules, which have the effect of bringing more people into line on this important matter. Towards the end of the year consideration was being given to a simple Bill for application in specific areas, with the object of protecting public works and essential catchments from the perils of indiscriminate and extensive cultivation without safeguards. A meeting of the heads of the technical departments concerned together with representatives of the provincial administration was held to discuss the matter, especially in regard to the measures which should be taken for the more effective application of anti-erosion works. It is interesting to note that in the Northern province some estate owners are taking steps to minimize the effects of erosion on their farms.

Marketing

There is but little change to report. The open markets in the Lake province functioned smoothly as was to be expected. In Bukoba, due to a shortage of immigrant labour, there is a greater tendency for native coffee planters to market dried cherry, which is treated in power driven cleaning works. As this tendency increases, it will become necessary to permit an increase in the number of licences for the erection and operation of such factories. We may anticipate a further improvement in the condition of Bukoba deliveries if this practice becomes fairly general.

In the Moshi area, a few native malcontents, one not a coffee grower, found opportunity to attack the property of the Kilimanjaro Native Co-operative Union which deals with all native coffee produced on Kilimanjaro. As the society not only collects, packs and markets the coffee of its members, but also provides agricultural instructors, and organizes the control of insect

**Mbuga* soils are heavy bottom-lands of a particular type.

pests (supplying equipment and materials free to its members), the value of the society can hardly be overstressed. The objectors found dissatisfaction with the amount of the bonus paid out on coffee after all costs of the society had been met, and the opposition arose because native coffee planters had the idea they were not getting enough money for their coffee. It is imperative that they be made to realize exactly what their association saves each native coffee planter. It is quite safe to say that a number of natives on Kilimanjaro could not be coffee planters unless some organization like the Kilimanjaro Native Co-operative Union were in existence.

Pests and Diseases

With the exception of a severe outbreak of coffee thrips in the Northern province, there has been comparative freedom from extensive outbreaks of crop pests. The locust position is satisfactory; only the Red locust (*Nomadacris septemfasciata*) has been present in small numbers. Breeding occurred in the extreme north-west of the Territory in the Kagera river flats, and in Songea district to the south. A small swarm appears to be dying out near Lake Manyara in the Rift Valley.

Cotton pests were little in evidence during the year under review; but a serious matter is the appearance, for the first time in the Lake province, of pink boll-worm which was reported towards the end of the season from the Musoma district. An especial clean-up of all cotton plants and crop residues was made, and quarantine measures will be applied to the coming season's crop. Due to excessive rains, internal boll rot caused serious losses of cotton in the Moshi district.

The presence of larvae of the sisal weevil (*Scyphophorus acupunctatus*) was observed in plant material despatched from the Tanga province to both the Central line and the Northern province; prompt measures were taken, and there is very little likelihood that this pest, so far restricted to the Tanga province, will spread to other areas, at least through this occurrence. An outbreak of sisal stem-rot, similar to that previously reported on the Central line where it was controlled by sanitation measures, occurred in the Tanga district. This was dealt with by Dr Storey, Amani, as the department's plant pathologist was absent on vacation leave.

The annual report of the Entomologist, Morogoro, is published separately as Entomological Leaflet No. 16. Details of the work of the Plant Pathologist, and the Entomologist stationed at Lyamungu, will be included in the annual report for the Coffee Research Station.

Export Crop Estimates

The following figures show the comparison between the estimates of export, published on the 1st April 1937, and the actual export of the chief products for the year:—

	Sisal Tons	Coffee Tons	Cotton lint Tons	Groundnuts Tons	Beeswax Tons
Estimate issued on 1st April 1937; Crops surplus for export	84,000	16,020	12,250	24,320	400
Actual export for 1937	90,639	13,612	11,518	22,251	738

There is a fairly heavy carry-over of coffee, due to the severe fall in price; similarly with sisal. Also the very low price of the second and third grades of

cotton resulted in much of this not being taken to market; the carry-over of cotton is not large.

The Railway is now collecting a gross revenue of some £2,000 a day, derived from the transport of the crops of the Territory and the requirements of the commercial and mining communities. In order that it may be considered a venture which is not a burden but one which helps the Territory economically, and carries itself financially, collections should approximate to £3,000 a day. This indicates how far the activities of the people in this territory fall short of meeting directly the needs of the Railway as a business concern. Only by accelerated development of the Territory and the raising of the agricultural output of the people will it be possible for this large public venture to come up to expectations.

Notes on the Chief Export Crops

Sisal.—The export of this crop rose during 1937 to the amount of 90,632 tons, valued at £2,079.204. The previous highest export figure is 82,676 tons for the year 1935. At the end of the year an appreciable carry-over was held in the Territory. As anticipated the price rose in 1937, but fell heavily in the last few months of the year. The fall in price to a large extent followed a general decline in the price of similar commodities: thus I do not think it may be argued that there is something underlying this fall which is applicable to sisal alone. On the other hand, as, within limits, certain fibres are interchangeable, and as it is the endeavour of the industry to seek new uses for sisal which may bring it more into competition with other fibres, I am advised that it is becoming important for the industry to take stock, not only of its own progress and welfare, but of the progress of other fibres, and the statistical world position of hard fibres in general, including local statistics of acreage and future output.

I have no fears for the industry in Tanganyika. Here we have excellent conditions which will have to be exploited in the most economical and efficient way possible, and as it is known that this is the constant study of the managements in the Territory I think it may safely be left with them to do their utmost. Especial thought must now be given to the system under which new plantings are made, with a view to the ultimate adoption of mechanical cultivation. Basically the industry is progressive and sound. Progress with research both overseas and locally can be recorded. The report for 1937 of the director of research on sisal, carried out at Lambeg, Northern Ireland, is being published.

The following are the figures showing production in the various areas for the three years:—

	1935 tons	1936 tons	1937 tons
Northern and Tanga provinces ...	49,374	49,092	58,109
Central line	22,613	22,702	19,438
Southern province	10,689	8,765	13,085
Total ...	82,676	80,559	90,632

A survey is being carried out to ascertain the potential sisal producing areas; the surveyors consist of an administrative officer, an agricultural officer, and a representative of the Sisal Growers' Association.

Details of the chief export crops for the past four years are given in the following table:—

PRODUCT	Maximum Output for Export prior to 1937		1934		1935		1936			1937		
			Amount	Value per ton f.o.b.	Amount	Value per ton f.o.b.	Amount	Total Value	Value per ton f.o.b.	Amount	Total Value	Value per ton f.o.b.
	Year	Tons	Tons	£ s	Tons	£ s	Tons	£	£ s	Tons	£	£ s
Sisal	1935	82,676	72,510	11 14	82,676	13 14½	80,559	1,873,312	23 7	†90,632	2,079,204	22 18¾
,, (manufactured)	1936	2,325	754	24 10	2,048	25 8½	2,325	75,942	32 13	526	17,023	32 7¼
Cotton lint	1936	11,274	5,645	57 17	9,980	57 1	11,274	640,625	56 16½	†11,520	603,594	52 8
Coffee	1935	18,588	14,766	33 11	18,588	26 4	12,146	342,990	28 4¾	13,612	429,501	31 11
Groundnuts	1936	22,786	8,036	7 10	16,429	12 16	22,786	277,226	12 3½	22,251	257,807	11 11¾
Hides and skins	1933	4,140	3,459	38 17	3,131	48 18	3,094	207,549	51 19¾	*†4,210	300,695	71 8½
Copra	1928	9,318	5,730	5 14	4,050	9 9	7,458	82,246	11 0½	7,522	104,757	13 18½
Sesame	1932	4,811	3,740	8 7	4,127	10 11	4,745	56,738	11 19	4,605	55,939	12 13
Rice	1936	6,513	6,259	12 5	4,924	13 12	6,513	73,508	11 5¾	†8,857	90,652	10 4¾
Millet and mtama	1928	7,732	2,735	4 9	3,597	4 5	3,539	14,636	4 2¾	4,187	18,491	4 8¼
Maize	1934	2,901	2,901	3 11	1,434	2 10	1,368	3,346	2 9	1,441	6,574	4 11¼
Beeswax	1933	680	407	80 7	531	87 2	524	52,040	99 6¼	†738	81,658	110 13
Tea	1936	37¾	4¾	139 0	9¼	124 6½	37¾	4,928	130 10¾	†98	13,486	137 12
Sugar	1936	3,442	—	—	—	—	3,442	31,382	9 1	3,099	30,616	9 17⅝
Gums (Copal and Arabic) ...	1934	1,124	1,124	19 12	848	20 10	475	13,223	27 17	886	25,877	29 4¼
Ghee	1936	713	662	40 13	607	40 6	713	34,144	47 17¾	710	51,265	72 4
Total ...		179,060¾	128,732¾	16 9¼	152,979¼	18 14¼	160,998¾	3,783,835	23 10	174,894	4,167,139	23 16½

*Includes 3,210 tons of hides and 1,566,115 skins weighing at approximately 1,500 per ton. †New highest export tonnages.

Coffee.—The production of this commodity is better than in 1936; exports amounted to 13,612 tons for 1937 compared with 12,136 tons in the previous year. There is also a heavy carry-over of estate coffee.

In Bukoba there is a welcome change in the attitude of the native planter towards his coffee garden, and it is possible to record that the work done in the direction of cleaning up *stephanoderes* is having a noticeable effect on the quality of bean reaching Bukoba for grading. The heavy fall in coffee values towards the end of the year may result in some neglect of the plantations but, as the majority of Bukoba natives depend on the coffee crop for a cash income, quite the opposite to neglect may occur. The native coffee industry both in Bugufi and Rungwe appears to be going ahead steadily, and on Kilimanjaro, despite certain difficulties prior to the opening of the buying season, marketing arrangements have gone with their usual smoothness.

Non-native coffee planters are still faced with considerable difficulty owing to the fact that the price of coffee is close to the cost of production, and the uncertainty of making a sale before charges have mounted so high as to cause a serious loss. It is increasingly clear that the future of the non-native coffee industry is bound up with the development under coffee of the most highly productive areas of the farm, with secondary ventures as a supporting adjunct. That Lyamungu will be able to provide high yielding quality stocks now seems assured. The farmer should arrange his planting and undertake such farming methods as are calculated to maintain the fertility of his property.

The export figures of the main coffee areas during the past three years are as follows:—

Area	1935 tons	1936 tons	1937 tons
Bukoba	10,882	6,504	9,540
Northern and Tanga provinces ...	7,234	5,174	3,717
Southern Highlands and other areas	472	458	355
Total ...	18,588	12,136	13,612

Of the 1937 export about 11,000 tons were exported as clean coffee and the remainder in parchment.

The approximate export figures of native and non-native (estate) grown coffee are as follows:—

	1935 tons	1936 tons	1937 tons
Native	12,944	8,704	10,815
Non-native	5,644	3,432	2,797
Total ...	18,588	12,136	13,612

The following are the particulars of coffee inspected and graded at Bukoba during the year:—

Number of bags of 200 pounds

	Graded			Rejected	Total Exported
	G.A.Q.	F.A.Q.	Triage		
Arabica	1,577	25,960	—	4,558	28,791
Robusta	1,077	78,260	402	8,367	79,739
					108,530

Cotton.—The establishment of permanent produce markets, including cotton, in the Lake province, as referred to in the last report, was hampered by a shortage of building material; as a consequence the permanent buildings of only a few market centres have been completed. The remainder have been laid out properly but the buildings are of a temporary nature only.

Largely as a result of the work of the two ginnery inspectors, provided by the British Cotton Growing Association, it is possible to report a considerable improvement in ginneries and in ginning. The inspectors have correctly interpreted their functions as ginners' advisers, until the new Cotton Ordinance, passed during the year, could be applied.

The new Cotton Ordinance removes some of the difficulties which surrounded the management of the crop. It is becoming more and more evident that commercial requirements will have to fall strictly into line with the agricultural needs of the crop. Where quarantines have to be imposed, clearly freedom to tout and purchase, and freedom to gin wherever the buyer wishes may have to be curtailed or even eliminated. The first consideration is the crop itself and the producer, rather than the individual desires and requirements of some of those who exploit the crop commercially. Zoning of an area to a ginnery or ginneries is often advantageous and restriction in the numbers of buyers operating follows automatically.

The industry must recognize that frankness, honesty and fair dealing are all important and that demands for allowances in the buying price, which are out of proportion to additional costs incurred, cannot be supported or acceded to: it can be recorded, however, that a number of ginners take the large view, and recognize both the underlying difficulties of the industry, and the need to give the best possible service to the producer.

The Cotton Board now established is advisory directly to the Governor, and deals only with those matters which are specifically referred to it by him.

Although in the largest producing area, the Lake province, the crop suffered heavily owing to unseasonable rains, other areas have come along well and practically maintained production. Had there been no set-back 75,000 bales was a certainty, and it should be no idle dream to look forward to a 100,000 bale crop in the future. As a matter of fact that output in due course will become only a milestone on the road. In the Eastern province practically all districts increased their output of cotton by considerable amounts.

The figures of cotton production are analysed as follows:—

PROVINCE	Season's Production of Lint in Centals				Seed-cotton in Centals *1937
	1934	1935	1936	*1937	
Lake and Western ...	106,501·1	158,820·7	170,712·5	123,194	395,501
Eastern	43,397·0	59,221·9	60,737·5	81,200	270,665
Tanga and Northern ...	3,334·0	13,155·5	34,321·4	32,800	109,330
Southern	2,804·0	2,955·2	3,706·0	4,800	16,240
Central	—	—	—	1,200	4,100
Total ...	156,036·1	234,193·3	269,477·4	243,194	795,836

*Approximate only.

Non-native production for 1937 is estimated at 6,065 bales of 400 pounds each, that is about ten per cent of the total production. The sale of seed-cotton by natives during the 1937 season is estimated to have returned to the growers Shs 7,366,500 or £368,325.

The actual export of cotton during the year was 64,499 bales compared to the previous year's record of 63,133 bales, but there was a considerable carry-over from 1936, and, owing to more efficient ginning, the amount which will be carried over to the next season is lower than usual.

Groundnuts.—As anticipated there was a considerable increase in the planting of this very valuable crop. Despite adverse weather which caused much pre-harvest germination, or locked the crop hard in the ground, the export practically reached last year's record; it amounted to 22,251 tons compared with 22,786 tons in 1936. As preached in and out of season, the cultivation of this crop should be encouraged everywhere possible; it is a valuable food, a sound rotation crop, and a source of revenue to the people and the Territory.

Sesame.—The cultivation of this oil seed is confined practically to the Southern province, where it is anticipated that soon the whole of the mixed coloured kinds will be substituted by the white seeded variety selected on lines evolved by Messrs Latham and Allnutt. During the year 4,605 tons were exported compared with 4,745 tons in 1936; it should be recollected, however, that a proportion of the crop is used locally in mills for oil production.

Copra.—The recovery shown in recent years in the copra industry has been maintained; exports amounted to 7,522 tons compared with 7,458 tons in 1936. In addition much greater amounts are now utilized by local oil and soap mills. While the palms are generally in good condition there is still room for improvement in the care and sanitation of the groves; the coconut is a palm which repays the elementary care necessary to keep down the surrounding bush and to check damage by the coconut beetle. The kiln-drying of copra has been demonstrated in the Tanga and Dar es Salaam districts as in Mafia; several plantations and large buyers have erected kilns of the Zanzibar type.

Grains.—It has been explained above that the rainfall during the year was generally unfavourable to the production of grain crops. Nevertheless all local requirements were met, including increased demands from the plantation and mining industries, and the export of grains exceeded last year's figures; that for rice was more than 2,000 tons greater than the previous highest figure. The total exports of wheat, rice, beans and peas, maize, millets, etc., was approximately 16,000 tons compared with 12,000 tons last year. Export has, of course, been encouraged by the higher prices commanded by foodstuffs throughout the world.

The following are the export figures for the three main grain crops for the past four years :—

	1934 Tons	1935 Tons	1936 Tons	1937 Tons
Rice	6,259	4,922	6,513	8,857
Sorghums and millets ...	2,735	3,597	3,358	4,187
Maize	2,901	1,434	1,368	1,441
Total ...	11,895	9,953	11,439	14,485

Tea.—Growers in the Mufindi area of the Southern Highlands province had, by the end of the year, practically completed the planting of the allocations made to them under the restriction scheme. Here the crop is divided between one factory area and a number of smaller non-factory estates. In Tukuyu there has been some consolidation of acreage—there being three main growers with factory areas; it is anticipated that practically all the acreage allocated will be planted in the early part of the 1938 season. In the Usambaras the acreage planted is practically up to the allocated figure. In the Rungwe and Mufindi areas the output of manufactured tea was 224,122lb. compared with 106,001lb. for the year 1936; of this amount 182,229lb. were railed for export and 41,883lb. sold locally, 19,011lb. for native consumption. The Usambaras production amounted to 157,726lb. against 98,925lb. in 1936, 55,703lb. being exported. The total exports for the year amounted to 98 tons valued at £13,486. There are four tea factories in the Southern Highlands and one in the Usambaras.

Towards the end of the year, advice was received that, under the international proposals for an extension of the period of the tea restriction scheme, the Territory had been granted a new allocation of 1,400 acres to be planted steadily over the five-year period 1938-42. This was granted chiefly for the purpose of placing the small grower in possession of an economic unit, and allocation will take place as was done in 1934 at a public meeting. Without any doubt the International Tea Restriction Scheme has operated to the benefit of this territory and tea planters are recommended to support the committee in its endeavour to popularize tea drinking throughout the world.

Sugar.—The plantation company operating at Arusha Chini, in the Moshi district, produced 3,742 tons of sugar during the year; 3,099 tons valued at £30,616 were exported, compared with 3,442 tons in 1936. Under the International Sugar Restriction Scheme, an export quota of 27,000 tons of sugar was allotted to the three East African territories for the period the 1st September 1937 to the 31st August 1938. A conference of East African sugar producers and directors of agriculture was held in Nairobi in order to make recommendations regarding the sub-division of the export quota; the amount allocated to this Territory was 5,100 tons, which should enable the estate to be developed to programme.

As with many other tropical countries there remain large areas of unexploited sugar land of excellent quality. As internal consumption increases it may be possible for a venture to arise based solely on the demand in the internal market. For the first nine months of the year, the internal consumption of sugar throughout the three East African territories, was 29,905 tons compared with 16,805 tons during the corresponding period of 1936; this indicates both the trend of prosperity of the local populations and the scope offered by the internal market for such luxuries as sugar as well as tea and coffee.

Tobacco.—The production of fire-cured native grown tobacco amounted to 177 tons in Songea, compared with 120 tons in the previous year; the quality was good. In Biharamulo 23 tons were sold. European production of Virginia fire-cured tobacco in the Iringa district further declined from 77,000lb. in 1936 to 66,000lb. in 1937. Production of Turkish tobacco amounted to 16,000lb. In the Northern province, 94,075lb. of pipe tobacco and 113,155lb. of cigars and cheroots were manufactured for local consumption.

Beeswax.—Climatic conditions were favourable to bee colonies and prices were high : as a result, a production of 738 tons was attained, compared with 524 tons in 1936 and the previous record of 680 tons for the year 1933. No complaints have been received from the trade regarding adulteration, in fact, quality has improved especially in the Southern province. Obviously the beeswax export regulations framed in 1935 have succeeded in the object of preventing adulteration; the rules are simple and call for no especial inspection officer. They merely insist on the breaking up of large blocks of beeswax into pieces not exceeding eight ounces, thus exposing any attempt at adulteration. Practically one-fifth of the imports of beeswax into the United Kingdom are obtained from the Territory.

Cocoa.—Eight tons of Criollo cocoa were exported from the Tanga district. The quality of the Sigi Segoma product ranks among the finest in the world.

Cinchona.—One and a half tons of quinine bark were exported from the Eastern Usambaras. The alkaloid content is high and the local product usually commands a premium. Over a million trees will be planted out in the Usambaras during the coming season ; nurseries are being established to try out this crop in other potential producing areas.

Kapok.—Production was a little below that of the previous year.

Oil palm.—A plantation in the Usambaras produced 30 tons of palm kernels and 15 tons of palm oil.

Papain.—Two estates are now producing papain in commercial quantities.

Essential oils.—The output of equelled oil, obtained from bitter orange, was 4,704lb. valued at Shs 8/- per lb., compared with 5,891lb. in the previous year. A distillation plant has been erected at Sigi Segoma for the manufacture of petit-grain oil ; a still is also projected for the production of neroli oils. Experiments with *ylang-ylang* oil in the Tanga area, and geranium, rose, and eucalyptus oils in the Iringa district, are being made. Lemon-grass oil is produced on a commercial scale in the Morogoro district. A trial consignment of vetiver (khus-khus grass) roots was sent to the Imperial Institute.

Insecticidal plants.—Pyrethrum is now successfully produced in the Arusha and Iringa districts ; the output is mainly utilized locally. Steps have been taken to ensure that only the proved Amani strain of *Derris elliptica* is grown throughout the Territory; much interest has been displayed in this crop and, both at Amani and Morogoro, the crop is being multiplied as rapidly as possible for distribution to planters.

Ramie.—While ramie grows successfully in areas of high rainfall, it has not been possible to produce it at a costings figure which could compete with "china grass". Trials of a decorticating machine have proved disappointing.

Fruits.—Citrus fruits are now more readily obtainable throughout the Territory and a considerable number of trees are planted each year on estates and by natives. The Muheza area supplies the Mombasa and Nairobi market with good quality oranges. From the Iringa district eight tons of plums and peaches were marketed.

Kweme nut (*Telfairea pedata*).—The production of this wild nut on a commercial scale is progressing in the western Usambaras. Exports to Europe have sold at high prices.

Gums (Copal and Arabic).—During the year the department was requested to take over the supervision of the marketing of gum; this cannot be carried out, however, with the existing staff. Partly as a result of more favourable

conditions and partly due to the lower prices received for cotton and groundnuts, an increase in the collection of this wild forest product is to be recorded; but the exports are still well below the record figure of 1,124 tons for the year 1934. The export was 886 tons valued at £25,877 as compared with 475 tons in the previous year.

Shinyanga is the main producing area and here it is reported that only two grades were recognized this season; but as traders offered practically no premium for the first grade product, the amount offered for sale at the native authority produce markets was negligible. Thus the inspection by the native authority employees of gum delivered to the markets was mainly with the object of detecting the presence of extraneous matter.

Food Crops and Nutrition

It is the first duty of the department to work towards the production of adequate supplies of food for local consumption. With the possible exception of the highland areas, any part of the Territory, in any year, may suffer a partial or almost complete failure of the rains. When this occurs a shortage of grain foods is likely to arise. Furthermore the possibility of locust depredations must be taken into account; such crops as maize, sorghums and rice are particularly vulnerable to this pest. The anti-famine policy is simple; it consists of the planting of adequate areas of such root-crops as cassava and sweet potatoes, both of which are drought resistant and are not damaged by locusts to any appreciable extent. Provision exists in the Native Authority Ordinance to enforce the planting of anti-famine crops wherever necessary. The improvident nature of the African makes it imperative annually to review the position in each district; a campaign in the first instance to plant root crops is not enough and orders have to be repeated to ensure that each family plants a new patch of either cassava or sweet potatoes. The districts of Bagamoyo and Handeni are outstanding examples of the value of cassava, a crop which was not grown by natives in those areas until a few years ago. Previously food shortages were frequent, famine relief had been given repeatedly, taxes were difficult to collect, and the population began to move out of the district. The story is a different one to-day : food reserves are plentiful, cotton is grown in abundance, tax is readily paid, shops have opened up and the people are now much more prosperous and contented.

The value of groundnuts as a food crop cannot be over-emphasized. The cultivation of the crop is confined mainly to the Lake and Western provinces and to a part of the Southern province. Elsewhere the labour involved in digging the crop from the ground appears to be a deterrent to its cultivation; nevertheless endeavour is being made to extend the crop, especially in the Kilosa, Morogoro and Handeni districts. It was introduced into the Same district in 1933, but, owing to unfortunate circumstances, the effort to extend its cultivation there had to be abandoned.

When new crops, such as beans or groundnuts, are introduced into an area for food purposes, it has been found helpful to prohibit their sale or export from the district; for traders will buy the new crop and send it out of the district with the result that a new issue of seed has to be made. The peasant is conservative in his dietary, and is more inclined to consume the new produce himself when he finds he cannot sell it.

The cultivation of vegetables is encouraged wherever possible, but one of the obstacles has been the exorbitant prices charged by local traders for seed

of poor viability. Several thousands of budded citrus plants have been distributed both to natives and estates from the Morogoro and Muheza nurseries. Estate employees are also trained in grafting and budding of fruit trees.

As indicated above the planting of anti-famine crops is an administrative matter but, departmentally, much work is carried out to improve the kinds and numbers, yields and qualities, of the staple food crops throughout the Territory. This work, which is a growing activity, is based on the experiment stations, and through the seed farms and demonstration plots the benefits are extended to the people.

The progress of the experimental stations is reviewed in section II of this report. Briefly the work on food crops is as follows :—

1. New exotic varieties, especially of rice, maize and sorghums, are constantly introduced : Kenya hybrid, Potchefstroom Pearl and White Cango varieties of maize are now widely grown; Johnson's County White and Muratha appear to be good short "age" types. Feterita has proved its worth as a quick-maturing drought resistant sorghum. Of the rice varieties, Demarara Creole, Bismati Pishori and Carolina are valuable importations.

2. Collections of indigenous varieties of rice, sorghums, cassava, sweet potatoes, and pumpkins are made, and varieties are tried one against the other both in respect of yield and quality and, in addition, with sweet potatoes and pumpkins, to ascertain their value as cattle fodder.

3. Selections of both indigenous and exotic rice varieties have led to the isolation and multiplication of pure lines which are superior in yield to the mixed native strains.

4. Cultural trials.

5. Manurial trials, include the residual value of farmyard manure and such green crops as sunn hemp.

6. Work on those pests and diseases affecting food crops is carried out in respect of the parasitic weed *striga*, control of maize stalk borer and the mosaic disease of cassava. As regards the latter one strain of seedling cassava has been isolated which has so far withstood all efforts to infect it with mosaic; the strain is being multiplied.

7. Entomological work is carried out regarding the keeping properties, and improvement in the storage, of the various grains.

Animal Husbandry

Owing to the geographical position of the headquarters of the veterinary and agricultural departments, the one at Mpwapwa and the other at Morogoro, and the extensive travelling required in connection with duties throughout the Territory, it is not always easy for the heads of these departments to maintain close personal contact. Meetings are, however, held from time to time; the policy of each department is known and discussed, and field officers are left in no doubt as to the desirability of consulting freely and of giving assistance mutually in regard to the problems and development of animal husbandry. Close co-operation does, in fact, obtain between the veterinary and agricultural officers stationed throughout the Territory.

The department is concerned mainly with linking more closely the *management* of cattle with the cultivation of the soil. Cattle are kept for draught and milk purposes, but even more so for the production of manure and the manufacture of compost, at the experimental stations and extension

farms of Ukiriguru and Kingolwira as well as at the Coffee Research Station and at the demonstration peasant holdings and native settlement centres. Cattle dips have been built by the department at both Morogoro and Kingolwira; the Veterinary Department contributed a portion of the cost of the Morogoro tank.

The Morogoro herd was originally supplied to the department, in the year 1931, by the Director of Veterinary Services, whose staff has given practical assistance and advice in maintaining the herd exposed to heavy tsetse infestation in the vicinity. The herd is now almost completely stall-fed. By means of irrigation and composting, and the utilization of crop residues, it has been found possible to maintain forty-five head of stock on fifteen acres of land. By means of dipping, East Coast fever has been controlled. As a result of six years work it is now considered that, given irrigation water, high-grade dairy cattle can be profitably kept in East Coast fever areas, and in tsetse country, provided sufficient clearing is done and care is taken. The work is regarded as of considerable importance, for there is a call throughout the Territory for the establishment of similar herds in townships, at mines, and on plantations having large labour forces, for the production by stall-feeding of both milk and beef. The environs of Dar es Salaam are rapidly being denuded of plant growth by the extensive grazing methods which are commonly followed; a modified system is surely called for.

In the Northern province some progress has been made in persuading dairy farmers to grow fodder crops for feeding their stock when grazing is inadequate during the dry season. Napier grass, lucerne and edible canna are grown; cotton seed is also fed as a supplementary ration. Also on Kilimanjaro, where the cattle are mostly stall-fed and the womenfolk cut and carry bundles of grass over long distances from the plains, the native is being encouraged to plant elephant grass on his holding. The success of the demonstration peasant holding at Baraza Kuu, Moshi, has proved to be the best form of propaganda in this respect. At the Nyakato Agricultural School, Bukoba, the district veterinary and agricultural officers have collaborated in feeding experiments to ascertain the causes of the low breeding rate of cattle in that area, and the low weight of the calves at birth.

SECTION II.—Details of Assistance and Progress

The organization of the department has been fully described in previous reports. A list of European staff is given as Appendix I; in addition eleven Asiatics are employed in a clerical capacity and one Indian overseer. The numbers of African staff are as follows:—

324 African instructors	15 messengers
5 station overseers	2 African teachers
9 farm foremen	1 industrial instructor
2 laboratory assistants	

In many districts the African field staff is reinforced by employees of the native authorities. The conditions of service do not, however, appear to offer the African an attractive career; this matter is under consideration. It is imperative to get the best type of African and to improve the standard of his work.

The post of agricultural lecturer was abolished during the year and provision made for a fourth senior agricultural officer to permit of the extension of the department's circle organization to cover the whole territory as below :—

North-Eastern Circle ... Northern and Tanga provinces
North-Western Circle ... Lake and Western provinces
South-Eastern Circle ... Southern and Eastern provinces
South-Western Circle ... Central and Southern Highlands provinces.

Unfortunately, owing to the serious illness of Mr C. K. Latham, Senior Agricultural Officer, and the delay in appointing the fourth senior agricultural officer, it was not possible to carry out the desired reorganization during the period under review.

Experimental stations for work with those annual food and cash crops which are of especial importance to native agriculture, have been maintained at Ukiriguru and Lubaga in the Lake province, and, in the Eastern province, at Mpanganya, Morogoro and Kingolwira. In addition to work on native crops, the Iheme Experimental Station, Iringa, deals with tobacco and temperate fruits. Of especial importance to the peculiar soil conditions of the Bukoba district, is the work carried out at Nyakato on coffee, food crops and animal husbandry. In addition, experimental plots exist for special work such as rice at Mwabagole, Lake province, and cotton at Kahe, Northern province. There are sub-stations and seed-farms, maintained by the native authorities in the Lake, Central and Southern Highlands provinces, with demonstration plots in the Southern and Lake provinces. Ploughing schools operate at Pawaga and Iheme, Southern Highlands province, at Lubaga, Ukiriguru, and Tarime in the Lake province, and Kingolwira in the Eastern province.

Peasant holding settlements and demonstrations are centred at Kingolwira in the Eastern province, at Nyamahona, Ukiriguru and Lubaga in the Lake province, and Mwanhala and Tumbi in the Western province. There is also a demonstration holding near Moshi in the Northern province, where it is considered the establishment of peasants in the foothills of Kilimanjaro is of importance.

Research work on coffee and sisal is carried out respectively at Lyamungu on Kilimanjaro, and at Mlingano, Ngomeni, Tanga province.

Reports of the senior agricultural officers on the areas of which they are in charge will be published separately in Part II of the report. Details of the work of the experimental stations are published separately as departmental pamphlets. A brief review of the work carried out in the several circles and provinces and at experimental stations is given below :—

North-Western Circle

Lake and Western Provinces.—The agricultural staff consists of a senior agricultural officer stationed at Mwanza, and an agricultural officer for each of the following areas: (i) Mwanza district including the Ukiriguru Experimental Station; (ii) Shinyanga district and Lubaga Experimental Station; (iii) Musoma district; (iv) Bukoba district and part of Biharamulo district; (v) the Tabora and Nzega districts; and (vi) Kigoma district. Agricultural assistants were posted to: (a) the Ukiriguru Experimental Station; (b) the Lubaga Experimental Station; (c) the Nyamahona farm and peasant settlement centre; (d) the Tumbi peasant settlement centre; (e) the Mwanhala peasant settlement centre; (f) the Nyakato Agricultural School; (g) the Bukoba district; and (h) Bugufi. A district foreman was stationed at

Maswa; in addition, one district foreman at Kasulu and two cotton supervisors were engaged temporarily. A ginnery inspector for the circle was stationed at Mwanza. A senior agricultural assistant was responsible for the coffee grading service at Bukoba.

During the first quarter of the year, climatic conditions were so good that the Lake province appeared to be well set for a season of bumper crops even transcending the spectacular results of recent years: the amount of cotton seed distributed for planting was 4,389 tons as compared with 3,671 tons for the 1936 season, the area under groundnuts was also increased and grain crops were planted in abundance. But, just when all crops should have enjoyed sunny weather, exceedingly heavy rains fell for a period of ten days; as a result the soil became waterlogged and not only did flowering plants suffer the usual physiological ill-effects, but the surface soil dried into a concrete-like crust which could not be broken up at the then late stage of crop growth. The yields of cotton were reduced by one-third. Groundnuts sprouted in the soil and were extremely difficult to harvest. Nevertheless, while individual yields were low, the total output of all the main cash and food crops was above the average of the past five years.

Coincident with the poor cotton yields, the price fell, and cotton production in the Lake province will receive a more severe setback than the remainder of the Territory, where climatic conditions were generally more suitable to the crop. The provincial administration are, however, fully alive to the value of cotton, both for cash and as a crop which is more resistant to drought than the grain crops and therefore especially valuable in years of light rainfall when food may have to be purchased. It is also an important part of any rotational scheme and as a cleaning crop.

The soils of the densely-populated areas of the Lake province which have been cultivated for many years are poor in fertility and low in humus content. Prior to the year 1930, a large number of Wasukuma proceeded annually to work on sisal and coffee estates, and thus a considerable portion of the land was able to recover under grass each year: by shifting cultivation crop yields were fairly consistent although poor. When labour recruiting ceased during the depression, the necessity of growing more food and cash crops arose and practically all land (in the densely-populated areas) was brought into continuous cultivation. Even with a more basically fertile soil and a high humus content, persistent cropping and consequent exposure to the desiccating influence of sun and wind, as well as of sheet-erosion, could not be continued with impunity. The danger does not, however, lie so much in the failure of cotton and other cash crops, as with the grain crops which are particularly susceptible to drought periods. It is thus imperative that better use be made of cattle manure; green-manuring must be commonly adopted; adequate measures must also be taken to prevent soil erosion, including reafforestation or natural regeneration of the hilltops and the extensive provision of wind-breaks. All these measures are demonstrated at experimental stations and seed-farms.

There is no doubt whatsoever that the "old lands" can be best kept under crops by the mixed-farming system of peasant holdings, as demonstrated at several centres throughout the Lake province. It will be many years, however, before many natives can reach the high standard which mixed-farming demands. Meanwhile the province is fortunate in having fertile unoccupied but tsetse infested lands into which the surplus population is moving. It is

not intended to permit such settlement of new lands to continue indiscriminately, when the eyes of the country would be picked out and the land subjected to accelerated erosion. Proposals have been submitted for controlled settlement; these are based on surveys already carried out by officers of the department and of the Tsetse Research Department. Mr Milne, Soil Chemist, Amani, has also made a study of the soils of the area. An administrative officer is engaged on an investigation of the land tenure of Sukumaland: an essential step before rules for resettlement may be enforced.

Early during the depression which caused the extensive cultivation of Sukumaland and accelerated the inevitable arrival of the problems of the overcrowding and over-cultivation of poor soils, the urgent need of more research was realized and the experimental stations of Lubaga and Ukiriguru were started. Each succeeding year has seen intensification of the work and results already indicate a solution of some of the problems. In connection with the Ukiriguru Station, the following extract from a report by Mr Milne, Soil Chemist, Amani, on a soil reconnaissance journey in the Lake province is given :—

> "I cannot offer any more detailed account of these Ukiriguru soils until analytical data are available on the samples taken, but the general tendency in soil development is clear and there is a practical conclusion to be drawn. As in other parts of the central plateau region, progressive erosion, both natural and 'accelerated,' is gradually diminishing the extent of red earths and kindred well-drained soil types, and is driving them in, as contracting zones, upon the high points of the topography. At their expense the grey sandy soils of the lower slopes and the dark-coloured heavy soils of the bottom-lands are becoming more extensive, increasing not only in the absolute area they occupy, but much more so in their relative importance as the principal agricultural soils upon which the population must depend. Upon the utilization of these lower lying soils, and especially of the heavy types, must agricultural effort and ingenuity more and more be expended as time goes on. Of course, in the meantime no pains should be spared in preserving the remnant zones of red earths and maintaining their fertility. But it must be recognized that their elimination by slow or accelerated erosion is a natural tendency, inherent in the topographic and climatic conditions. The soil is travelling downhill, changing its fundamental characters as it occupies successively lower positions. Thither inevitably the cultivator must follow, changing his methods just as fundamentally, in adaptation to changing soil conditions. The productive lands of the future in Usukuma will have to be the *mbugas* and their sandy and 'hard-pan' fringes. At the Ukiriguru experiment station the opportunity exists for working out the necessary adaptations of agricultural method, and in particular the methods of heavy-land utilization that will be more and more needed. It is in these directions that its activities can be most profitably concentrated."

It is obvious that the heavy *mbuga* lands represent important soil wealth to the Lake province.

Thus, with the extensive tracts of unoccupied virgin land and the desire of many of the Sukuma people to occupy these lands, with the extensive *mbuga* soils awaiting a more specialized form of cultivation, and with the extension of peasant holdings, there can be no doubt as to the ultimate welfare of the Lake province. During the change over there may occur seasons of inadequate

rains when cash and food crops will be poor; but this should not cause uneasiness, since the attainment of the desired objective will merely be accelerated.

With the object lessons before them of the Jaluo tribe and of the many incoming natives who have taken to ploughing, the cattle owning tribes of the northern part of the Musoma district are turning more to agriculture. The district's highland soils are fertile and there is now good opportunity of increasing the local supply of maize especially to meet the requirements of the nearby mining industry. In order to accelerate this movement, and especially to see that the use of implements does not result in the ruination of the hillsides, an agricultural officer has been reposted to Musoma and ploughing schools and demonstration farms have been started.

In the Bukoba district, the sanitation of coffee gardens is now on a better footing than heretofore and the chiefs are taking a more lively interest in the care which should be given to the coffee crop. The Bugufi coffee growers have maintained the excellence of their cultural methods; pulperies have been built to deal with a crop amounting to 76 tons, as compared with 44 tons in 1936 and 16 tons in 1935. The first crop from the new cotton area of Missenye was most satisfactory and there appears to be no doubt that the area can ultimately support a ginnery.

The building of permanent produce markets, projected in the 1936 report, was commenced. The progress of the system, which has been in operation since 1932, has belied the early criticisms levelled against it; buyers have expressed their satisfaction, but more important is the fact that producers would loudly protest against any suggestion to abolish the produce market. Over 22,000 tons of produce with a cash turnover of nearly £180,000 passed through the markets the management of which cost less than two per cent of the turnover; within a few years, due to increased turnover the local marketing cost should be less than one per cent.

In the Western province, despite the losses in the groundnut crop due to the abnormally late and heavy rains and a fall in price at the peak of the marketing season, more groundnuts were sent out of the province than ever before. In addition, owing to the fall in price, unusually large amounts of groundnuts were retained by natives for home consumption. Quick-maturing groundnuts are being introduced. A large increase in rice cultivation has been achieved, over 1,000 bags of seed of improved Faya rice were distributed. It is now obvious that most of the Nzega and Kahama districts are marginal areas for cotton, hence no encouragement is now given to this crop in the Western province. The cultivation of beans has been extended and the maintenance of cassava plantings insisted upon.

Improvement of the staple food crop position is sought in the following manner—

(a) increase in yields of maize by manuring;

(b) elimination of low yielding strains of sorghums;

(c) replacement of a part of the sorghum crop by bulrush millet, preferably by selections from the awned type (this crop is more resistant to drought and stalk borer than either maize or sorghums);

(d) regular annual plantings of mosaic-free cuttings of cassava, and of sweet potatoes;

(e) control of the parasitic weed *striga*;

(f) increase in rice plantings in swamps and in the catchment areas of half-moon dams;

(g) extension of the cultivation of pulses.

The sleeping sickness concentrations continue to make steady progress. The peasant holding settlement centres of Tumbi and Mwanhala should exert a potent influence on the agriculture of the Western province.

Details of the agricultural work and progress of the two provinces will be found in the report of the senior agricultural officer in charge of the circle in Part II.

North-Eastern Circle

Northern and Tanga Provinces.—The senior agricultural officer in charge of this circle is stationed at Moshi with agricultural officers at: (i) Arusha including the Mbulu district and the Sonjo area of Masailand; (ii) Moshi; (iii) Lushoto (for half the year only); and (iv) Tanga. Agricultural assistants are normally stationed at: (i) Moshi; and (ii) the Same district; a district foreman is stationed at Handeni.

Climatic conditions were decidedly unfavourable to crop production over the greater part of this circle. The short rains at the end of 1936 were scanty and were followed by an excessively dry period; as a result the early grain crops were poor and thrips caused severe damage to coffee. The long rains were heavy and prolonged; maturing crops of both grain and coffee suffered from lack of sun, and yields were below normal. The promise of high prices for sisal, coffee and cotton which held in the first half of the year, was not borne out in the event; a severe slump in all three commodities occurred and whereas sisal is poduced evenly throughout the year and so enjoyed a period of high prices, coffee and cotton mainly came into the market at its lowest level. Despite this the output was well maintained and for sisal was a record. Cotton shows a decrease of ten per cent. The exports of coffee did not come up to expectation but, following the fall in price, planters delayed selling and it is estimated that two-thirds of the current season's crop is still in their hands. The Handeni district alone experienced good climatic conditions and the production of cotton, maize and pulses was considerably increased whilst millet was introduced with some success.

The European maize planters in Moshi district increased the area under cultivation, and the production of maize for export and local consumption was well-maintained; yields were poor but prices good. Tsetse handicaps the planters in their efforts towards mixed-farming; the position is complex and has been investigated by the Director of Tsetse Research.

The issue three years ago of wheat seed to farmers in the Arusha district has resulted in a considerable extension of wheat production both by Europeans and natives. Yields of eight to nine bags per acre at a price of Shs 16/- to Shs 20/- per bag, represents a profitable return. The Kenya Department of Agriculture has kindly assisted in the provision of seed of new varieties and has advised regarding local problems.

Perusal of the senior agricultural officer's report in Part II shows both the diversity of crops which can be grown in the northern part of the Territory, and the opportunity this fertile area gives for both European and native development. In addition to the staple crops such as sisal, coffee and cotton, and the minor industries of sugar, tea, copra, maize, rice and wheat growing, there is every scope for a large increase in the production of potatoes and onions, citrus fruits, essential oils, kapok, cocoa, quinine, soya bean, derris,

palm oil, oyster nuts, and tobacco. All these can be grown under most suitable conditions of soil, rainfall and water supplies, in areas well served by road and rail.

The importance especially to the Northern province of the development of a dairy industry, pig-keeping and animal husbandry generally, cannot be over-estimated. Demonstration peasant holding plots are situated at Moshi and Lushoto. Both European and native dairy cattle owners are following advice given as to the cultivation and feeding of fodder crops and cotton seed to their stock.

The Muheza citrus demonstration plot has proved the kinds of stocks and varieties of orange and grape fruit most suitable for the area. The demand for citrus trees by the management of sisal estates to provide fresh fruit for their labour, is now greater than can be met at once.

Good progress in extending anti-erosion measures, which has been consistently reported from the Northern province, has been maintained. On Kilimanjaro especially the methods advocated are becoming part of the natives' ordinary agricultural practices. The demarcation and protection of all riversides and ravines has effectively regenerated the vegetation which formerly was destroyed by goats and cultivation. Native authority orders are in operation in every district. European planters in the Oldeani area have now made considerable headway in combating the serious erosion which has taken place on their farms.

South-Eastern Circle

Southern Province.—It has not been possible to maintain the numbers of staff required for this province. A senior agricultural officer is stationed at provincial headquarters, with an agricultural assistant to serve the coastal belt, and two agricultural assistants in the Songea district. One of them deals mainly with tobacco and the other is stationed at Lipumba in the Matengo highlands where he can best deal with the new coffee areas. A district foreman was stationed at Kilwa until March. Unlike the virile tribes of the Songea highlands, the coastal natives are not receptive of advice and rather disregard demonstrational work directed at improvement in agricultural methods.

In seasons of good rainfall there is abundance of grain crops, but in less favourable seasons, as this proved to be especially for the southern part of the Territory, the harvests are barely sufficient to supply home requirements. During the past three to four years, production has undoubtedly shown a large increase both of food and exportable crops, but a much higher standard of individual production should be expected in the future.

The Tunduru natives have taken to cotton with some enthusiasm, but it is yet too early to say whether production will warrant the erection of a ginnery. Elsewhere cotton growing has somewhat increased, but the coastal growers have displayed deep dissatisfaction at the fall in price. When the season is unsuitable for grain crops, the Southern province is usually recompensed by a good sesame crop; a further increase in the sesame exports is to be recorded.

The native tobacco industry has enjoyed a most successful year. Yields were high and quality excellent; disease was absent and 177 tons were disposed of by the Ngoni-Matengo Co-operative Marketing Union, Limited; nearly £4,000 was paid out to growers. The Union also sold the small coffee crop for the growers of the Matengo highlands.

Non-native enterprise has been active and sisal planters are trying out a number of crops to stabilize their position. Some sisal estates had insufficient leaf, and are seeking new land for development; the Kilwa district is an area well worthy of attention in this respect.

It can be said, however, that the Southern province has done fairly well despite poor rainfall conditions. The details of the agricultural development and progress will be found in the report of the senior agricultural officer in Part II. The remaining areas of the Territory, having no circle organization, are directly controlled by headquarters. These are the Eastern, Southern Highlands and Central provinces.

Eastern Province

Agricultural officers were stationed at: (i) Dar es Salaam, including the Bagamoyo district; (ii) Morogoro for the district, experimental station and the Kingolwira peasant settlement; (iii) Kilosa; and (iv) Mpanganya, Rufiji. Agricultural assistants were stationed at: (i) Mafia; and (ii) the Kingolwira peasant settlement centre. A district foreman was stationed at Utete and cotton supervisors were engaged for the season for the Ulanga and Bagamoyo districts.

Climatic conditions throughout the province were satisfactory for cotton and sisal, but less favourable for rice and other grain crops. Estate production increased considerably and native production expanded concurrently. For the first time cotton production in the province passed the 20,000 bale mark; production in the Rufiji district may closely approach 4,000 bales before the season ends (in February), mainly due to the success of both *upland* and *mlau* flood-land sowings; the Ulanga district has passed the pioneer stage; Kilosa has made further headway; the renascent district of Bagamoyo has practically doubled production; and the Morogoro district has considerably increased its output as compared with recent years, though still somewhat below its pre-depression standards. Despite the unfavourable climatic conditions for the growth of grain crops, the production of foodstuffs was more than adequate; conditions were, however, somewhat adverse to the rice crop. The output of copra was increased; following the demonstrations of kiln-drying of copra several large buyers and non-native estates have built kilns of the Zanzibar pattern.

Much progress has been achieved in the regeneration and re-equipment of sisal estates. Clearing and preliminary cultivation for sisal is now carried out by mechanical means on one large estate. Many non-natives have abandoned cotton as a profitable crop; in several instances the cultivation of this crop year after year on the same land has destroyed the productive capacity of the soil. Considerable interest has been displayed in such crops as ramie, derris, tung oil, lemon grass, oyster nuts and papaine.

Advice and instruction to natives is carried out mainly on the following lines:—

(a) Early planting of short rain maize followed by cotton interplanted in the ripening maize in March.

(b) Line planting and spacing of all crops.

(c) Soils suitable for cotton and the time of planting.

(d) Increased planting of groundnuts and beans.

(e) Adequate planting of cassava and sweet potatoes as a measure against drought and locusts.

(f) Production of fruit and vegetables.

(g) Anti-soil erosion measures.

An outbreak of field mice and house rats in the Kilosa area was controlled by the use of barium carbonate bait ; a trained native staff was used to carry out the work.

The progress of the Kingolwira peasant settlement centre, situated in the Morogoro district, has aroused interest in this and other countries. It is, and for some years must remain, an experiment, which, if carried to the successful issue we believe can be ultimately attained, will be of fundamental importance in the development of the native areas of the Territory, and should lead to appreciable improvement in native hygiene and housing. Details of progress are given later in this report.

Southern Highlands Province

Agricultural officers are stationed at : (i) Tukuyu for the Rungwe, Mbosi and Mufindi areas ; and at (ii) Iheme for the experimental station and the Iringa, Dabaga, Njombe and Lupembe areas. Agricultural assistants are stationed at : (i) Tukuyu, mainly for the native coffee and food crops in the Rungwe and Mbosi areas ; and (ii) at the Iheme Experimental Station. Arrangements have been made to station the Agricultural Officer, Tukuyu, at Mbeya (the provincial headquarters), which is more central to the large area served by him.

Climatic conditions were abnormal, e.g. during part of the year the rainfall at Tukuyu was only fifty-five inches compared with the average of eighty-two. The latter part of the year was unusually cold and wet. Although most crops, including coffee, tea and grains, were late in ripening, the season was one of progress and crop abundance.

A great deal of time was taken up in supervising tea plantings, to ensure compliance with the provisions of the Tea Restriction Ordinance : in this connection the Tea Planters' Associations rendered valuable assistance. There are 37 tea estates in the province. In co-operation with planters, experiments on manuring and pruning have been carried out. The high standard of tea planting and cultivation has been maintained ; output was as estimated. There is no doubt, however, that 100 acres cannot be regarded as an economic unit for the Mufindi area at least.

While there is an increase in the total production of estate coffee in the Mbosi area, average yields are lower ; this is due to early mistakes in planting and to loss of soil-fertility by erosion. Planters are adopting remedial measures and new plantings are now all on contour terraces. Experiments with manuring, shade trees, cover crops, and cultivation methods are in train. The Mbeya District Planters' Association have generously handed over their demonstration plot, with house, for experimental work to be carried out under the aegis of the coffee research station ; uniformity trials were continued. Despite the elimination of poor coffee in the Rungwe area, the output of estate coffee in Rungwe has been maintained and should increase with the extra care and attention that can now be given to the reduced acreage. The native coffee crop, both in Rungwe and Mbosi, continues to expand on satisfactory lines ; production was doubled. The crop was marketed by groups of natives ; the coffee being graded, bulked and bagged by departmental staff. Satisfactory prices were obtained by tender. Co-operative effort has been organized for treatment of *hemileia* and other pests and diseases and for the supply of planting material.

Many planters from the Mufindi, Dabaga and Lupembe areas (who, under the Tea Restriction Ordinance, are not permitted to plant tea) have transferred to Mbosi; the financing company concerned is formulating a programme of development similar to that which has proved so successful with the Mufindi tea growers, including supervision of the work of the planters it supports.

With a view to improving the food supplies of both the native people and the Lupa mining industry, seed of Kenya hybrid maize has been distributed. Supplies of rice, beans, peas and potatoes were so increased that there was a glut of foodstuffs. Cinchona nurseries were put down at Mufindi and Tukuyu, the former under control of the local forestry officer was successful. Cotton was again tried experimentally on the lake shore area of Rungwe district, but, with the exception of one small area near the Nyasaland border, soil conditions have generally proved unsuitable. Derris is being tried and pyrethrum has proved a suitable crop for parts of the Iringa district.

At various centres throughout the Rungwe, Mbeya and Mufindi areas there are thirty-five plots demonstrating anti-erosion measures. Progress has been outstanding in this area; native authorities have applied rules for the prevention of erosion; 306 prosecutions were instituted. Bush fires have been strictly controlled, especially in the mountainous region with effect which can already be seen in the regeneration of forest growth.

Mechanical implements are now more generally used by the natives of the lake shore area; ploughing schools exist at Iheme and Pagawa. Rotary tillers are used in tea cultivation, particularly in the opening up of new gardens, with consequent relief to labour requirements; the previous years' shortages of labour were not experienced.

Wheat growing is now well established in the Iringa district; co-operative agencies have been formed to assist in the milling and disposal of the crop. Production exceeded 400 tons. Trials of imported varieties and Kenya selected strains have been carried out. A further decline occurred in the production of fire-cured tobacco; the best Iheme selection again proved its superiority over other kinds. Whilst on leave, the Agricultural Officer, Iheme, interviewed various tobacco firms with regard to the disposal of tobacco and new methods for its preparation.

There can be no doubt that European farming in the Iringa district should take the line of mixed-farming with as great a diversity of crops as possible. In addition to wheat, maize, tobacco and pyrethrum mentioned above, the area is well suited to barley, temperate fruits (over eight tons were sold from European farms during the year 1937), and pecan nuts, and to essential oils such as geranium, eucalyptus and damascene rose. A good outlet for meat exists both on the Lupa mine-fields and the Central line, two bacon factories are in operation and the factory and farm production of cheese should also be a profitable venture. The development company mentioned in the report for the year 1936, should exert a beneficial effect on farming throughout the Southern Highlands; excellent breeding stock has been imported, and these should provide the foundation of an improved cattle industry, while the breeding of horses and the general organization work of the company should provide settlers with a comfortable start and with those amenities which on to-day's standards of living are more and more regarded as necessities. It is unfortunate, however, that the uncertainty of world conditions may deter newcomers, whereas the disturbing speed of change in the more industrialized countries should be an added incentive to people to embrace the attractive and healthy life of a settler,

especially where a parent development company removes many of the usual pioneering difficulties.

Central Province

It has not been possible to post any European agricultural staff to this province since the year 1934. A district foreman was, however, stationed at Singida during the year to assist in the establishment of the new cotton crop, which reached approximately 200 tons, or double last year's production. The main cash crop is groundnuts. Agricultural matters were discussed with the Acting Provincial Commissioner, who has done much to initiate an agricultural programme for the area. Arrangements have been made to post an agricultural officer to the province whose first work will be with urgent anti-erosion measures and the carrying out of a general agricultural survey of the area.

Experimental Work

When prices of raw materials fall to the point which gives little if any margin of profit the need and value of research and experimental work is more commonly recognized, and it was during the recent economic depression that the main planting industries agreed to the levy of a cess on exports, in order mainly to finance the coffee and sisal research stations. Generous financial assistance was also forthcoming from the Colonial Development Fund and the Empire Cotton Growing Corporation. Thus, with a slightly increased contribution from general revenue, the Territory is well equipped with facilities for crop experimentation and research which should be of real service to the individual planter and are essential to the development of the Territory. But scientific effort, however successful it may be, cannot supplant good farming practice. The breeding and introduction of improved crop varieties can directly add to the output of food and cash crops, but usually by increased demands on soil fertility which if not added to, or at least maintained, will become the more depleted by the heavier crop yields.

The reports, for the year under review, of the Morogoro, Kingolwira, Mpanganya, Ukiriguru, Lubaga and Iheme stations, which deal mainly with such annual crops as cotton, groundnuts, grains and other food plants, are given in pamphlet No. 21. That of the Mlingano Sisal Station in pamphlet No. 20. The Lyamungu Coffee Station's report will deal with the twelve months ending the 31st March 1938.

It should be noted that the experimental work of the annual crop stations has been going on for a number of years, and it is now possible to indicate results which may be safely utilized by officers for demonstration and extension in the field. The work of the various stations is reviewed below.

The Coffee Research and Experimental Station, Lyamungu, Northern Province.—The manner in which the coffee station has been laid out and developed has been well spoken of both by visiting scientific workers and the practical farmer ; it reflects credit on Mr S. M. Gilbert, Chief Scientific Officer, and his staff. From time to time criticism is made that the station is too ambitious, on the other hand every branch of the work is essential and requests have been made by responsible bodies for the appointment of even more staff to undertake additional coffee research work.

In a recent issue of the *Quarterly Notes* of the Station (No. 4 of 1937) it is recorded that "the Usa and Meru West Associations sent their combined delegation on one of its regular visits on the 18th October. On this occasion the

main discussion was on experimentation. The Chief Scientific Officer explained the methods in use and the reasons for tree recording before the application of treatments in field experiments. The delegation expressed itself as completely satisfied that such work was essential in the circumstances." I would go so far as to say that the work now carried out at Lyamungu is much more than likely to lead to results which, if adopted and incorporated into practice, should place the Territory's coffee industry in a strong position in relation to other coffee producing countries.

Preliminary recording of individual coffee trees, the need for which has been amply confirmed, has been extended to thirty estates and native holdings. Selection of desirable trees has continued and, over a period of four years, a dozen or so have yielded equivalent to a ton of parchment coffee an acre per annum. Seed from selections has been distributed to estates and planted in nurseries and will be tested in the field in about twenty areas, beginning in 1938. Vegetative propagation proceeds steadily and some 1,500 distinct clones have been planted out, all of which have desirable characteristics.

A four-year-cycle of experiments on four estates is complete. It is clear that abnormal weather in 1936 and 1937 prevented significant results being obtained in those two years. Nevertheless, there are strong indications that the use of sulphate of ammonia, pen manure and mulch at the correct times and seasons is sound practice; the experiments continue. I would, however, remark that the manuring of poor class coffee, using expensive imported fertilizers may not be an economic proposition. Research work, carried out by the chemist is providing evidence as to the causes of the increased yields obtained after applications of sulphate of ammonia and organic matter. Soil analyses are gradually indicating the extent of the areas to which the findings of the experiments will apply. The entomologist has begun an investigation of the problem of Leaf Miner control. The arboretum of shade trees has been extended. A coffee factory and drying shed suitable for both experimental and estate work are nearing completion.

The Sisal Experimental Station, Mlingano, Tanga Province.—Twenty-four acres of land were cleared for the labour lines and to accommodate the factory which is to be equipped with a single drum decorticator and brushing machinery. Preparatory work on the site for a large new dam was carried out.

No new experiments were laid down; results of the existing experimental work should indicate the direction which new work might take. The Blue sisal (*Agave amaniensis*) was cut for the first time and the marketing of a bulk consignment of fibre will be carefully watched. Suckers of Blue sisal distributed within the Tanga province numbered 72,550. The collection of *agaves* received from Amani was increased by five to a total of twenty-five different species. The breeding of *agaves* is undertaken by the Geneticist, Amani; the seedling plants are multiplied at Mlingano and now number about 3,000. Several hybrids of *A. amaniensis* by *A. angustifolia* give promise, and demonstrate the likely value of plant breeding to the fibre industry. Citrus and mangoes (for labour), derris, *Mundulea suberosa*, and ramie were also grown; also plots of cassava for trial of mosaic resistance (in co-operation with the Plant Pathologist, Amani). Co-operation is closely maintained both with Amani, and with Dr Gibson, the director in charge of sisal research at Lambeg. Acknowledgment of this assistance is gratefully accorded.

The main sisal experiments consist of the following: (i) a cultivation trial, which from the start has shown the depressing influence of weed growth on

sisal (the clean weeded plots produced three times as many new leaves as the unweeded plots); deep cultivation in the year 1936 resulted in a setback from which the plants have not yet recovered; (ii) in the spacing trial, the effect of interplant competition is now apparent; there is a preponderance of leaf in the closely planted plots which may, however, lead to the production of second grade quality fibre; (iii) tests of cutting, which will follow seven different methods; (iv) plant material trials: it was found that bulbils made more rapid growth in the first year than suckers, and that deep planting retards growth as does trimming the lower leaves and roots off the suckers; (v) in the variety trial *A. amaniensis* has grown quicker and better than the other varieties, but does not bear so many leaves as *A. sisalana*: the total weight, however, is heavier by reason of the greater length of leaf.

Other experiments which are at too early a stage to comment on, are: (i) the common sisal *versus* blue sisal cutting trial; (ii) the blue sisal spacing trial; (iii) the interplanting trial of beans, maize and cotton with sisal; (iv) sucker control; and (v) manurial trials. Root growth and sun-scorch observations are also carried out.

The Morogoro and Kingolwira Experimental Station, Eastern Province.— This station is mainly concerned with work on food crops and cotton, also animal husbandry with special reference to stall-feeding of dairy cattle and the working of oxen in tsetse areas. Trials of indigenous and introduced varieties of sweet potatoes are carried cut, embracing the aspects of both a food crop and cattle fodder. All known indigenous varieties of sweet potato are being collected. Work has continued, in collaboration with Amani, on the isolation of strains of cassava resistant or tolerant to mosaic disease; it appears that indigenous varieties have a low resistance to the disease under Morogoro conditions, so that the search is for tolerant rather than immune strains. Two varieties, Kru from the Gold Coast and Turkey Claw from Trinidad, and a local selection from seed, show, however, promise of some resistance to the disease. In the sorghum trials, it has been shown that the variety Kobero is unpalatable to birds which, in part, accounts for its being the heaviest yielder. The Barberton variety of groundnuts has proved a better yielder than either Virginia Bunch or the local native kind.

A number of cultural and manurial experiments were carried out with food crops. Planting maize on ridges gave an increase of more than fifty per cent above the native method. Green manuring with sunn hemp resulted in a sixty-four per cent increase; it appears that green manuring, properly done, has greater beneficial effect than the application of farmyard manure or compost, but there are indications that the residual effect of farmyard manure is greater.

One of the problems arising from the settlement of peasants on newly cleared holdings at Kingolwira has been the poor grain crops produced in the first year; an improvement in yield being seen in subsequent seasons. No such phenomenon is observed with cotton. Investigation is being made to ascertain the period required to bring the soils into good heart and the methods which may be followed to accelerate this; it has been ascertained that in the second year on these soils, maize shows a 150 per cent increase in yield irrespective of the method of cultivation. With pennisetum millets, yields were all higher in the second season and the results show that deep and frequent cultivation appears to be essential only in the first year.

Variety trials, and plant selections were carried out with cotton. The U/4 derivative "998," obtained from Nyasaland, and seed bulked from about one hundred of the best of the 1936 selections of the local cotton, gave the highest yields. The U/4 types have a ginning outturn up to 37·4 per cent, but the quality of lint is inferior to the local strains. Some selections made in 1935 and planted in single plant progeny plots in 1936, are showing promise; the best have yielded the equivalent of 1,100 pounds an acre against 924 pounds for the "998" variety and 836 for the control of local cotton. Further trials will be carried out before seed-multiplication is begun. Observations on 360 single plant selections made in the year 1936 were continued. This work of plant selection is of especial importance to the Eastern province which produces a cotton commanding a high premium, but the yield from the seed at present in general use does not satisfy us. Cultural experiments show that the highest cotton yields are obtained by ridging over the weeds in rows. The practice of planting two plants per hill was shown to be sound, but the value of inter-planting leguminous crops in cotton is open to question.

By means of edible canna, elephant grass, bonavist bean, sweet potato tops, Rhodes grass, and a ration of cotton seed, the dairy herd at Morogoro has been maintained in much better condition than the herd at Kingolwira, which is a drier area where fodder is more difficult to supply. This may explain to some extent the comparative freedom from relapses of *trypanosomiasis* enjoyed by the Morogoro herd. Compost manufactured amounted to 190 tons.

The Morogoro Plant Nursery.—The nursery previously situated on the experimental station was removed to a more elevated site where the soil is more suitable for plant propagation. The main work has been the supply of citrus plants and mangoes to private individuals and native authorities; also the multiplication of derris cuttings and the raising of *Aleurites montana* (tung oil) seedlings.

The Kingolwira Peasant Settlement Centre.—The establishment in 1933-34, when the Territory's finances were low, of the Kingolwira Settlement was made possible by the financial aid given by the Empire Cotton Growing Corporation, who appreciated the fact that the future of cotton production within the Empire should be based on mixed farming rather than on a form of one-crop shifting cultivation. The fundamental principles and objectives of peasant holdings and native settlement have been described above; here a brief description of the progress of Kingolwira is given.

The area reserved to the department for controlled native settlement is situated seventeen miles east of Morogoro township. It is sixty square miles in extent and consists of unoccupied dense tsetse infested bush; of this area about 3,000 acres have been cleared, including land for an experimental station, seed farm, peasant holding centre and prison farm. The Director of Tsetse Research has frequently advised regarding the form of clearing to be adopted; the Directors of the Medical, Veterinary and Education departments have also given their advice and have encouraged the work by visits to the centre. The local medical officer has taken a practical interest in the hygiene, housing, and general welfare of the project.

The agricultural methods to be followed by the peasant settlers are based on the experimental results obtained from work carried out at the Morogoro experimental station and, latterly, at the experimental farm at Kingolwira. It is expecting a great deal of the local natives for them to abandon their old primitive methods for the high standard demanded by mixed farming, and

when the difficulty of eliminating tsetse (both the *morsitans* and the *pallidipes* species are present, the latter being especially troublesome) is added, the project should be regarded as an *experiment* for some years to come; the slogan "hasten slowly" must ever be kept in mind. At the same time the work of settlement must proceed fairly quickly in order to push back the fly.

So far, propaganda in the district to induce settlement has not been made. Thirty-five peasants have been in occupation of their holdings from one to two seasons and twelve more entered at the end of the year. There are three demonstration holdings now in their third season; here the work is kept a year or so ahead of the settlement in order to provide a visual progressive objective. The demonstration holders are now in a position to receive their cattle; one is equipped with dairy stock, drought oxen and the necessary mechanical implements. It will be some time before the fly position will permit settlers to introduce cattle with safety; all the work on their holdings is done by hand at present, yet their income is several times greater than that of cultivators living outside the settlement. In addition to his grain crops one settler received Shs 572/- for his cash crops, two were over the Shs 450/- mark, others between Shs 300/- to Shs 400/-; the majority obtained well over Shs 200/- in cash. This represents a very high standard of wealth to the peasant cultivator and has led to the building of a model shop which, in consultation with the Dar es Salaam Chamber of Commerce, will be stocked with useful goods. There will be every need to encourage "wise spending," as once the native becomes possessed of cash far beyond his present subsistence requirements, he is apt to become demoralized and to give up work of any kind until his resources are exhausted.

When entering a holding the incoming settler enters into an agreement to follow the advice of the agricultural officer, and is on probation for a year. Subdivision of the holdings (which are fourteen acres in extent, are laid out to minimize erosion, and are designed to provide adequate grazing as well as food and cash crops) is prohibited. The numbers of stock to be kept are also restricted.

The co-operation of the Medical Department includes the payment of Nyasaland and Northern Rhodesian artisans to demonstrate brick burning and building, and thatching. Several settlers have built sun-dried brick houses under the supervision of Mr Foster, the Agricultural Assistant, whose practical knowledge of building has been invaluable to the centre. Development work during the year included the building of labour lines and a cattle dip.

The Prison Camp and Farm.—With the dual object of training long-term prisoners in agriculture, especially mixed farming, and the useful employment of short-term prisoners in the labour of tsetse clearing and, by means of a prison farm including a dairy herd (to be provided when the fly position permits) and citrus orchards, in maintaining themselves with food, a prison camp was established at Kingolwira two years ago. About eighty prisoners are accommodated; burnt brick-buildings, model kitchen, latrine and bath-houses, have been erected by the prisoners themselves, which, with the use of timber cut on the property, has resulted in the establishment of a permanent prison at a remarkably low cost to the State.

The prison farm is 250 acres in area of which 87 acres have been brought under cultivation. On the perimeter, peasant holdings are laid out for training long-term prisoners and for their occupation, should they desire to do so, when they have completed their sentences. Ten selected long-term men are receiving

especial instructions; two men, released on licence, have been settled on holdings with model burnt-brick house and kitchen; another is now on daily parole, developing the holding which he himself selected. A visiting judge of the High Court has recorded his satisfaction with the scheme, and his desire to see its extension at least within the Territory.

The Mpanganya Experimental Station, Rufiji District, Eastern Province.— For the fifth successive year, Mpanganya suffered severe damage from the Rufiji river floods; large areas of the farm were washed away, the buildings are threatened and the experiments ruined. An introduction of seed of Tokar cotton from the Gash delta, Sudan, was made with most promising results. It is unfortunate that the danger of annual flooding necessitates the closing of Mpanganya as an experimental station; but the promising Tokar work will be carried to finality.

The Lubaga Experimental Station, Shinyanga District, Lake Province.— This station serves the semi-arid hinterland regions of the Lake province, dealing mainly with cotton, groundnuts, maize and sorghums. For the third year the "998" strain has given the highest yields with better lint than the U/4/4/2 cotton grown throughout the Shinyanga district; the former strain was also grown at one hundred different centres to test its suitability for the district. From over two hundred plant selections, thirty-seven of the most promising have been chosen for further trial.

The time of sowing experiment has again demonstrated the value of early planting of cotton for the Lake province hinterland, and two plants per hill is again shown to be sound practice. The residual effect of the application of six tons of farmyard manure an acre was significant.

With groundnuts, the superiority of the erect Barberton variety was indicated. Selections of local and introduced types are promising. Kenya hybrid and Potchefstroom Pearl maize gave higher yields than White Cango or the native kinds, and the application of farmyard manure to Bulrush millet gave significantly higher yields over the unmanured control plots. Demonstration plots have been laid down to show the advantage of ridge over flat cultivation. Crops grown for seed distribution and as food for stock included the following: groundnuts, beans, grams, soyabeans, chick peas, millet, sorghum, maize, cassava, pumpkins, water-melons, tomatoes, potatoes, canna and sunn hemp. Various farm implements were tried out and their use demonstrated to the peasants. Owing to the failure of the local traders to stock the agricultural goods for which there is a demand, an agency has been formed at Lubaga in co-operation with Dar es Salaam importers.

The Ukiriguru Experimental Station, Mwanza District, Lake Province.— The Ukiriguru station is designed to serve the conditions of the lake littoral and to demonstrate the agricultural use of the heavy *mbuga* soils. It is expected that, following the work of plant selection, a strain of cotton will be forthcoming having higher yielding qualities and better ginning outturns than the ordinary district cotton, as well as improved lint. A bulked lot of seed of three selections has given significantly higher yields than either "998," a mass selection or the local cotton. Where cotton is grown on *mbuga* land, a dressing of farmyard manure or green manuring appears to be desirable. Over a series of years, the optimum period for planting cotton is shown to extend from the beginning of November until the end of December.

Trials of selections of oil and food crops were made. Mass selected Mwitunde variety of groundnut, the Kabunde and Nzange selected sorghums, also the

Bukuru Mahemba, Magole and Nghollongo Tembe native varieties of sorghums were outstanding. The advantage of lining-out grain crops was shown. A trial of various grain crops on *striga* infested land gave no visible indication as to resistance of the different grain crops to *striga* damage, but Kenya hybrid maize yielded much higher than millets or sorghums. The excessive and unseasonal rains adversely affected the manurial experiments, but previous year's results show the value of applying farmyard manure both for immediate yield and for the residual value which can be observed over a period of three to five years; to some extent, the same is apparent with green manuring.

Work on rice is carried out at the Mwabagole substation of Ukiriguru. The variety Majimaji has proved the best yielder over a number of years, yielding up to 4,220 pounds of paddy an acre; it is, however, being replaced by a selection of Affa which commands a higher price. Several varieties have been introduced; these are now acclimatized and are yielding better than most local types. Plant selection work was continued.

Development work only was carried out at the Nyamahona extension farm in the new Uzinza area. The risk of tsetse fly is now small and the use of oxen possible. Despite the fact that the progress of this station has been slow, it has formed a valuable centre for settlement; in addition to the controlled area, a large number of natives are taking up land round the farm with the result that a trading centre has arisen in an area which three years ago was unoccupied bush.

The Iheme Experimental Station, Iringa District, Southern Highlands Province.—The Iheme station serves both European and native farming interests in the Southern Highlands. The Iheme selected Virginian variety of tobacco has supplanted the variety Heavy Western previously grown in the district. An Iheme selection of Xanthi Turkish tobacco is also now exclusively grown because of its easy curing properties. The results of experimental and demonstration work with irrigation, contour ridging and the use of farmyard and artificial manures is beginning to be put into practice by planters. A selected lot of Kenya varieties of wheat were tried, especially in regard to stem rust, and advice can now be confidently given regarding this crop. Varieties of such fruit as plums, peaches, grapes and almonds are under trial; peculiar difficulties are met with in almond growing which are being investigated. Essential oil plants are grown and an experimental still has been installed.

The Kahe Cotton Trial Plot.—Two years ago, Mr H. C. Ducker, Cotton Specialist, Empire Cotton Growing Corporation, investigated the cotton growing areas of the Territory with a view to the establishment of a central cotton breeding station. He picked on Kahe, Moshi district. It was first essential, however, to ascertain the pest and disease position; accordingly a trial block of thirty acres of cotton was put down in 1936 and again last year. The area appears to suffer from all the common pests found in cotton east of the Rift Wall; but none are unduly prominent.

The Nyakato Agricultural School.—Simple experimental work is carried out at the Nyakato centre by the Agricultural Officer, Bukoba, and the Agricultural Assistant in charge of the school. This has amply proved the importance of compost to Bukoba soils; the fertility of the land at Nyakato is extremely poor and below the average for the district, yet the coffee and grain crops are now outstanding. Of equal importance has been the animal husbandry work, carried out in co-operation with the veterinary officer, which

has demonstrated the desirability of feeding such concentrates as cotton seed and the residues of oil factories to the breeding stock especially. The average weight of calves at birth out of cows receiving supplementary rations has been nearly 42 pounds compared with approximately 26 pounds from cows on grazing alone. Bukoba cattle breed only in alternate years : it remains to be seen whether the young female stock will calve annually with regular and systematic feeding.

Agricultural Education

Legislation is sometimes necessary to protect the welfare of the farming community, especially with backward races. For example : in the matter of the control of pests and diseases ; to maintain the quality of such crops as cotton, coffee and tobacco ; to prevent the ruination of land by soil erosion, and to bring into line a defaulting minority, as in the case of anti-erosion measures, and the preservation and care of grazing and water supplies. It is not, however, the ideal method of approach to any objective of improvement in agricultural methods ; consequently the policy of the department has been to follow persuasive methods by means of demonstration and propaganda, to take advantage of every educative means to achieve improvement in crop and animal husbandry, and to co-operate with other departments in the general effort to achieve a better and happier standard of living for all sections of the agricultural community.

There is a great need for mass education of the African peasant cultivator. Full advantage has been taken of the agricultural stations, seed-farms, peasant-holding settlement centres, and the school gardens attached to both the central and the bush type of schools, in order to educate, as far as possible, the local population to a better understanding of agriculture. At the Ukiriguru and Lubaga experimental stations more than two thousand natives were conducted over the farms in parties ; keen interest was displayed by the visitors. Furthermore, classes are held at both the above stations for the farm labour and local peasants ; although most of those attending are uneducated, they displayed both interest and enjoyment in the classes. Several families have been in residence at the Lubaga adult school ; besides education in reading and writing, they acquire practical experience on the farm and receive instruction in woodwork, ironwork and brickwork.

Generally speaking the African youth is reluctant to undertake a training in agriculture. Several reasons to explain this have been adduced by Mr Turnbull, a Rhodesian educationist : the practical training savours too much of work ; work in the field is not regarded as education ; the results of practical work are not immediately apparent ; clerical and certain technical employments give greater monetary gain, and town life is a growing attraction to the educated boy. There are welcome signs, however, that the educated African is less reluctant to look to farming as a vocation. Mr Turnbull, has written : "For the happiness and prosperity of the African people, and for the present and future contentment of the educated boy and girl, it is imperative that the gap between school and community be lessened rather than made more wide by a premature scheme of secondary education. The majority of people still depend upon agriculture for a livelihood, and a growing population is still located in rural areas. And yet the very person we want in such areas, the educated schoolboy, can never settle happily therein until the conditions of that life more nearly approach the standards set before him in the school." It is believed that peasant holdings, as demonstrated at Kingolwira and other

settlement centres, will materially assist in solving the problem of the educated African.

It is obvious that the European agricultural officers cannot hope to influence the masses without the active assistance of a large well-trained African staff. African instructors have done excellent work, but before any appreciable headway can be made in extending improved methods of agriculture to the mass of peasant cultivators, a better type of educated man who has been well-trained in agriculture, will be required in much greater numbers than are employed to-day. Refresher courses for members of the departmental and native authority African instructor staffs are held at Nyakato, Ukiriguru, Lubaga, Mwanhala, Tumbi, Moshi, Iheme and Morogoro. A course of instruction in the preparation of beeswax and apiculture generally, is given each year by the Entomologist, Morogoro; this was attended by twenty-seven African instructors and native authority employees, including two sent from Northern Rhodesia.

The Nyakato agricultural school is now under the charge of Mr Higgens, an Agricultural Assistant, who has displayed especial aptitude for educational work. Forty-seven applicants for admission were received of whom only twenty-nine could be accepted, bringing the attendance up to forty-three pupils. A general education is given together with a theoretical and practical training in agriculture. A scheme for an agricultural training centre at Kingolwira has been formulated.

Estate agriculturists most frequently request advice by letter and by visits to the local agricultural offices, but as far as possible every estate or farm is visited at least once a year in order that any especial difficulties which the farmer encounters may be ascertained. It is the duty of the agricultural officer to act as a liaison between those who are engaged in agriculture, and while attention is never specifically drawn to any individual's mistakes and cultural errors, which are often inevitable, much good can be achieved by pointing to the many examples which exist of good farming practice as object lessons which could be profitably followed. Planters associations have given valuable assistance in providing close co-operation between the department and the non-native agricultural community. Full advantage is also taken of the *East African Agricultural Journal* as a medium for the dissemination of agricultural information. As previously stated, quarterly notes of the coffee and sisal stations are printed and issued, through the associations concerned, to all planters of these crops; there is an ever-increasing demand from abroad for these notes which are written in non-technical language with the purpose of keeping the respective industries informed of the progress of the stations which they finance.

Publications

The following pamphlets were published by the department during 1937:—

No. 16: Sisal Experiment Station Report for 1936.
No. 17: General Experiment Farms Report for 1936.
No. 18: Flue-cured Tobacco. By C. J. McGregor, Agricultural Officer.
No. 19: Coffee Research Station Report for 1936.

The following leaflets were published by the department during 1937:—

Departmental leaflets.

No. 9: Notes on Food Crops and Supplies. By J. C. Eyre, Agricultural Officer.
No. 10: The Vegetable Garden on the Coast. By W. Sibley-Warne, Agricultural Assistant.

Entomological leaflets.

No. 14 : Report of the Entomologist for 1936 (incorporated in the general annual report of the department).

No. 15 : A Home-made Insecticidal Spray for Garden Use. By W. V. Harris, Entomologist.

Other articles published during the year were as follows :—

Stalk Borer, *Busseola fusca* Hmpsn. By W. V. Harris, Entomologist.

Root Crop Investigations. By N. V. Rounce, Agricultural Officer.

Agricultural Education. By C. B. Garnett, Agricultural Officer.

Notes on Pink Bollworm in Tanganyika Territory. By W. V. Harris, Entomologist.

Articles sent to the Editor of the *East African Agricultural Journal* for publication during the year 1937 were as follows :—

The Control of White Stem Borer of Coffee. By R. M. Davies, Senior Agricultural Officer.

A Revised List of Plant Diseases in Tanganyika Territory. By G. B. Wallace, Plant Pathologist.

The Grey Field Mouse. By W. V. Harris, Entomologist.

The Improvement of Native Agriculture—A Review. By E. Harrison, C.M.G., Director of Agriculture.

The Close Planting of Groundnuts. By W. C. Clarke, Agricultural Assistant.

Helopeltis Bug. By W. V. Harris, Entomologist.

A Study of Methods of Cultivating Sisal in Kenya in comparison with those used in Tanganyika. By G. W. Lock, Agricultural Officer.

The Oyster or Kweme Nut. By R. J. M. Swynnerton, Agricultural Officer.

The Oil Palm (*Elaeis guineensis* Jacq) in the Kigoma District. By T. C. Cairns, Agricultural Officer.

The Marketing of Coffee. By T. S. Jervis, Senior Agricultural Assistant.

Beekeeping for Beginners—Part I. By W. V. Harris, Entomologist.

Notes on the Susceptibility of Indigenous Trees to *Armillaria*. By G. B. Wallace, Plant Pathologist.

Beekeeping for Beginners—Part II. By W. V. Harris, Entomologist.

Individual Native Smallholdings. By N. V. Rounce, Agricultural Officer.

Notes on Trials of Ramie in Tanganyika Territory. By J. C. Eyre, Agricultural Officer.

Other articles were as follows :—

Quarterly Notes of the Sisal Experiment Station.

Quarterly Notes of the Coffee Research and Experiment Station.

Memorandum on Soil Erosion. By E. Harrison, C.M.G., Director of Agriculture.

SECTION III.—Finance

The financial provision for the period from the 1st January to 31st December 1937, together with the estimated expenditure, is given below. In comparing these figures with those given in 1936, attention is drawn to the inclusion of "Upkeep of Coffee Research Station," which appears for the first time under "Other Charges." This item is supplementary to the free grant of £4,000 from the Colonial Development Fund, and is to enable the full programme for the year to be carried out at the coffee research station. A grant of £1,110 is also made by the Colonial Development Fund for the sisal experimental station.

The Empire Cotton Growing Corporation repeated their annual recurrent grant of £4,740, and a further £290 was expended during the year from the original capital grant of £6,850, leaving a balance on hand of approximately £320. The salaries of two ginnery inspectors for the year, amounting to £1,060, were again provided by the British Cotton Growing Association. The financial assistance afforded by the councils of the above two bodies is gratefully acknowledged.

The total estimated expenditure of the department (excluding Special Expenditure) is £20 less than in the previous year. A saving of approximately £3,000 under "Personal Emoluments" was due to the changes which occurred in the holders of certain posts and to delays in filling vacancies.

The following are the estimates of direct revenue from fees and taxes in 1937, compared with the sums actually collected during the three previous years :—

	1934 £	1935 £	1936 £	1937 £
Bukoba Coffee Grading Fees ...	2,628	2,900	1,329	1,816
Sisal Tax	2,464	4,245	4,141	8,480*
Coffee Tax	1,600	2,563	1,372	2,450
Cotton Tax	3,100	5,600	6,336	6,330

The details of the provision and expenditure referred to above are given in the following table :—

	Provision for the period 1.1.37 to 31.12.37 £	Estimated Expenditure for the period 1.1.37 to 31.12.37 £
Personal Emoluments.		
Administrative	5,945	5,676
Scientific Staff	4,601	4,432
Field and Experiment Farm Staff ...	37,730	35,262
Total Personal Emoluments ...	£48,276	£45,370

*Tax increased from Shs 1/50 to Shs 2/- per ton, as from the 1st May.

	Provision for the period 1.1.37 to 31.12.37 £		Estimated Expenditure for the period 1.1.37 to 31.12.37 £
Other Charges.			
Travelling (including Railway Fares and Freights, Travelling and Transport Allowances, and Transport)	8,700	...	7,885
Upkeep of Experimental Stations and Plantations (including part Coffee Research Station)	8,633	...	8,430
Upkeep of Nyakato Agricultural Training Centre	604	...	531
Upkeep of Ploughing Schools	200	...	174
Purchase of Seeds	100	...	46
Plant Sanitation	150	...	127
Purchase of Tools and Scientific Equipment	300	...	299
Expenditure on Cotton Tax Services ...	3,000	...	2,594
Agricultural Development, Special Services	200	...	58
General Expenditure (including Books of Reference, Tents and Camp Equipment, Uniforms for African Instructors, Typewriters, Upkeep of Museum, Agricultural Shows, Stationery, Bicycles and Contingencies)	867	...	741
Total Other Charges ...	£22,754	...	£20,885
Grand Total ...	£71,030	...	£66,255

It should be noted that of the total, a sum of no less than £15,614 is provided by reimbursements and cross entries making a net £50,641.

	Provision for the period 1.1.37 to 31.12.37 £		Estimated Expenditure for the period 1.1.37 to 31.12.37 £
Special Expenditure.			
Empire Cotton Growing Corporation—Capital Grant	621	...	290
Sisal Experiment Station — Capital Expenditure (excluding Public Works Department work)	461	...	312
Coffee Research Station—Capital Expenditure (excluding Public Works Department work)	400	...	400
Total Special Expenditure ...	£1,482	...	£1,002

A list of European staff as on the 31st December 1937 is given as Appendix I.

SECTION IV.—Legislative Changes during 1937 as affecting Agricultural Industries

1. *Coffee.*—The Native Coffee (Control and Marketing) Ordinance, 1937, was enacted. This Ordinance provides for the establishment of Native Coffee Boards in any area or district of the Territory for the purpose of controlling the cultivation, preparation and marketing of native-grown coffee.

2. *Cotton.*—(1) The Cotton Ordinance of 1920 was repealed and replaced by an Ordinance to make provision for the control of the cultivation, harvesting, purchase, sale and ginning of cotton and the trade in cotton lint. The machinery provided by the existing legislation was inadequate to deal with the situation created by the rapid progress of the industry in recent years. The new Cotton Ordinance provides for a more practical control by the Director of Agriculture over the cultivation and harvesting of cotton from the time of seed-distribution to native growers, up to the burning of residues after the crop has been picked. Provision for the control and prevention of cotton disease is also included.

(2) The new Ordinance deals also with the grading of raw cotton and allows the Director of Agriculture to order the sorting of cotton into two or three grades for sale as may be required. Under the provisions for the control of the purchase of raw cotton grown by natives, all cotton buyers must register before they can obtain a licence to buy. It is ensured that the sale and purchase of native-grown cotton is carried out under proper conditions to the best advantage of producer and buyer. The Ordinance also provides for the declaration of cotton buying posts and the periods when cotton may be purchased.

(3) Other provisions include the control of ginning and baling cotton; the erection of ginneries, the number and kind within any particular area, and the prices that may be charged for ginning.

(4) Under the Ordinance rules were made fixing the fees to be paid in respect of: (a) certificate of registration as a cotton buyer; (b) cotton buying licence; (c) permit to erect a ginnery; and (d) licences for a public ginnery and planters or private ginnery. The fixing of the minimum price formula was also regulated; also the dates for the opening of cotton market and the uprooting and burning of cotton plants.

(5) A Cotton Board was established as provided for under the Ordinance.

3. *Plant Protection.*—An Ordinance to make better provision for the prevention of the introduction and spread of disease destructive to plants was passed under the title of the "Plant Protection Ordinance, 1937." This Ordinance was enacted as a result of the Conference of East African Governors held in 1935, when it was agreed to accept the recommendation of the Conference on Co-ordination of Agricultural Research and Plant Protection held at Amani in 1934, that there should be uniformity in legislation for the control of plant pest and disease throughout the East African territories. The Plant Pest and Disease Ordinance of 1921 was repealed.

4. *Sisal.*—(1) The Sisal-Hemp (Export Tax) Order, 1937, provides for an increase in the sisal tax which is now levied at the rate of Shs 2/- per ton of sisal-hemp exported as from the 1st May 1937.

(2) An Ordinance to provide for the establishment of a Sisal Board termed the "Sisal Board Ordinance, 1937," was enacted during the year. The main

functions of the board are: (a) to consider and advise the Governor upon measures for the promotion and protection of the sisal industry; (b) to receive, consider and advise the Governor upon any recommendations advanced by the Tanganyika Sisal Growers' Association or other association of a like character in the interests of the sisal industry; and (c) to expend such moneys, as authorized, in such manner as it may consider is best calculated to promote the interests of the sisal industry.

5. *Sugar.*—Under the Customs Ordinance, an order was passed limiting the exportation of sugar from the Territory to countries other than Kenya and Uganda to 2,148 tons between the 1st September to the 31st December 1937. This was an interim figure pending the agreement of the East African territories regarding the sub-allocation of the quota of 27,000 tons of sugar, allotted to East Africa under the International Sugar Restriction Scheme, for the first restriction year the 1st September 1937 to the 31st August 1938.

6. *Soil Erosion.*—Under the Native Authority Ordinance authority was given enabling all native authorities to make orders for the adoption of anti-erosion measures.

Conclusion

I desire to record the thanks of the department to those who have helped in the work during the year, mentioning especially the members of the cotton, sisal and coffee boards, and officers of the Provincial Administration, the East African Agricultural Research Station, Amani, and other agricultural departments in East Africa. To members of the staff of the department credit is due for their loyalty and for the way in which they have carried out their duties during the year.

Morogoro,
5th February 1938.

E. Harrison
Director of Agriculture

APPENDICES

Appendix I

List of European Staff as on the 31st December 1937

Director: E. Harrison, C.M.G., Head Office, Morogoro.

Deputy Director: A. J. Wakefield, Head Office, Morogoro.

Senior Agricultural Officers: C. K. Latham, on sick leave; R. M. Davies, Moshi; D. Sturdy, Mwanza; one vacancy.

Chief Scientific Officer: S. M. Gilbert, Coffee Research and Experimental Station, Lyamungu, Moshi.

Plant Pathologist: G. B. Wallace, Coffee Research and Experimental Station, Lyamungu, Moshi.

Entomologists: W. V. Harris, Morogoro; F. B. Notley, on leave.

Chemist: H. B. Stent, Coffee Research and Experimental Station, Lyamungu, Moshi.

Agricultural Officers: J. V. R. Brown, Dar es Salaam; R. D. Linton, Tabora; B. J. Hartley, M.B.E., Arusha; F. R. Sanders, Coffee Research and Experimental Station, Lyamungu, Moshi; J. Robertson, Kilosa; F. W. Thomas, Tukuyu; R. B. Allnutt, Tanga; J. R. Curry, Moshi; N. R. Fuggles-Couchman, Morogoro; G. W. Lock, Sisal Experimental Station, Ngomeni, Tanga; D. Thornton, Ukiriguru, Mwanza; N. M. Wight, Musoma; H. Gillman, Shinyanga; T. H. Marshall, Head Office, Morogoro.

On leave.—C. B. Garnett, C. Harvey, A. S. Stenhouse, H. Marsland, C. J. McGregor, A. H. Savile, N. V. Rounce, T. C. Cairns, J. G. M. King, J. C. Eyre, R. J. M. Swynnerton.

Agricultural Officers (Ginnery): P. W. Briggs, Mwanza; N. Field, on leave.

Senior Agricultural Assistants: T. S. Jervis, on leave; C. J. M. Krige, Kingolwira, Morogoro.

Agricultural Assistants: E. T. Ward, Iringa; R. W. Collett, Lipumba, Songea; L. Leslie-Moore, Bukoba; G. S. Brown, Mafia; B. E. Eustace, Tukuyu; A. Taylor, Moshi; W. Sibley-Warne, Lindi; L. F. Higgens, Bukoba; R. Seager, Mwanhala, Kahama; A. A. E. Weirich, Sisal Experimental Station, Ngomeni, Tanga; B. R. D. Eccles, Nyamahona, Mwanza; H. L. Brett, Bugufi; G. H. Foster, Kingolwira, Morogoro; D. Shepstone, Tumbi, Tabora; J. H. McGregor, Songea; C. B. Gibbins, Coffee Research and Experimental Station, Lyamungu, Moshi.

On leave.—A. Young, W. C. Clarke, H. A. B. Fowler, R. Silcock.

Senior Overseer, Agricultural Stations: C. E. Allen, Shinyanga.

District Foremen: N. W. E. McDermott, Maswa; E. Pienaar, Handeni; V. Allen, Singida; R. Thierry, Utete.

Chief Clerk: D. F. T. Brown, Head Office, Morogoro.

European Clerk: C. H. Taylor, Coffee Research and Experimental Station, Lyamungu, Moshi.

List of Public Ginneries Licensed in 1937

Province and District	Locality	Number of Gins		Licensees
		Saw	Roller	
Eastern:				
Dar es Salaam ...	Ruvu ...	—	16	Vithaldas Haridas and Co., Ltd.
,, ...	Pugu ...	—	18	Abdulrasul and Sons.
Morogoro ...	Morogoro ...	—	22	Tanganyika Cotton Co., Ltd.
,, ...	Mikesse ...	—	21	East African Cotton Co., Ltd.
,, ...	Ngerengere	—	11	Liverpool Uganda Co., Ltd.
,, ...	Duthumi ...	—	18	Tanganyika Cotton Co., Ltd.
,, ...	Turiani ...	—	16	,, ,, ,,
Kilosa	Kilosa ...	—	18	Juma Haji.
,, ...	Rudewa ...	—	22	Tanganyika Cotton Co., Ltd.
,, ...	Msowero ...	—	14	Kladitis and Samaris.
,, ...	*Berabera ...	—	12	Kimamba Planters' Ginning Co., Ltd.
Bagamoyo ...	Mandera ...	—	20	Liverpool Uganda Co., Ltd.
Rufiji	Kilimani ...	—	12	,, ,, ,,
,, ...	Msomeni ...	—	20	,, ,, ,,
,, ...	Logeloge ...	—	8	East African Cotton Co., Ltd.
Ulanga	Kiberege ...	—	9	Vithaldas Haridas and Co., Ltd.
Southern:				
Lindi	Mtua ...	—	14	Mathuradas Kalidas and Co.
Kilwa	Kikanda ...	—	10	Kikanda Cotton Trading Co., Ltd.
Mikindani ...	Mikindani ...	—	5	Keshawji Anandji and Co.
Tanga:				
Korogwe	Korogwe ...	—	25	Moshi Trading Co., Ltd.
,, ...	Sindeni ...	—	14	,, ,,
Northern:				
Moshi	Moshi ...	—	24	Moshi Trading Co., Ltd.
Mbulu	Idulu ...	—	12	Jamal Ramji and Co.
Lake:				
Shinyanga ...	Usogore ...	—	12	Bhagwanji Sunderji and Co.
Mwanza	Mwanza ...	—	25	Nakasero Trading Co.
,, ...	Murutanguru	1	24	Ladha Meghjee.
,, ...	Ihale ...	—	14	Mwanza Cotton Trading Co., Ltd.
,, ...	Bukumbi ...	—	16	Bhagwanji Sunderji and Co.
,, ...	Nassa ...	—	20	Narandas Rajaram and Co. (Africa), Ltd.
Kwimba	Nyambiti ...	—	20	Lake Province Cotton Co., Ltd.
,, ...	Pambani ...	—	15	Kampala General Agency.
Maswa	Malampaka	—	11	Bhagwanji Sunderji and Co.
Musoma	Mugango ...	—	20	Lake Province Cotton Co., Ltd.

*Non-Native cotton only.